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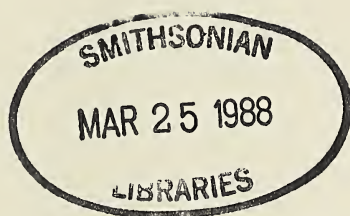
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VOL. I.

ABINGDON, ILLINOIS, JUNE 1, 1895.

NO. 1.

## The Western Meadow-lark.



AMONG the song-birds of Colorado none will more completely win the interest and admiration of all than the meadow-lark of the West (*Sturnella neglecta*). Popularly called a lark, he is really a member—and that, too, an important one—of the American starling family, which includes the orioles, and is quite different from the starlings proper. He is the warbler *par excellence* among all the varieties of songsters that in this region have come under my notice, and I doubt if the “lark of the poets” (*Alauda arvensis*) is more than a rival of this wondrous singer of the plains. The soaring lark may have greater lung power, but hardly can his tones be more clear and liquid, or his repertory of songs contain a more varied selection. He is certainly inferior in personal beauty, and he sings as he flies, while the meadow-lark of the West makes any convenient post, rock, or tuft of grass

or weeds his stage, and there sings to you by the hour.

However slight may be the technical points in which this songster may differ from the Eastern meadow-lark, the difference in song is certainly very marked, as noted by all observers since Audubon. While there is much greater variety, there is also a quality in his tones which would make them seem almost out of place in an Eastern grove or meadow. They are also loud enough to be heard a long distance, even in the face of the stiff breezes which blow here during much of the time that the birds make their sojourn with us. The sweet and mellow character or flute tones, or those of the smaller kinds of wooden organ-pipes, would perhaps give a musical ear some idea of the quality of our singer's notes; but besides this they are possessed of a wild, indescribable quality that is in strict keeping with the nature of his haunts—mountain valleys which are rude and retired, and the treeless, half-dreary, semi-barbaric plains of the West. He is heard most frequently in

the twilight, whether of morning or evening; but during the pairing time his song may be heard the whole day long.

It is said by good authorities that the bird is half domestic in its habits, preferring the neighborhood of places where man has settled, and where the culture of the soil affords better sustenance. Present facts go to support this view, for they are certainly to be found in great numbers throughout the regions where irrigation has changed the barren plains into rich farms and gardens.

As soon as the rigor of winter has given place to the warmer days of spring, the meadow-larks appear upon the plains. At first few in numbers, no sooner do the plains don their summer robes, and the flowers become lavishly abundant, than they appear on every hand, and their songs ever fill the air with melody.

Besides his song tones and melodies the bird has a cry of alarm and warning which has little of the pleasing character of his other notes. It consists of a sharp, loud chirp, very rapidly repeated, and there is no fear of misinterpreting its meaning. In walking over the short buffalo-grass of the plains, and among the cactus beds which infest the whole region wherever irrigation has not destroyed them, one is suddenly startled by this musical rattle, and turning the eye in the direction of the sound, the meadow-

lark will be seen skimming along in a straight line, a few feet from the ground until he has reached a safe distance.

The bird nests upon the ground, choosing a protected spot; it may be a bunch of weeds, or, if upon the open plains, it often selects a clump of sagebrush or a bed of cactus. If the former is chosen, a convenient opening is made well within the clump; and there the nest is built. If the cactus bed is preferred, the meadow-lark hollows out a little place in the ground, lines it with soft and curly buffalo-grass, and then builds over it a little canopy, pulling down the longer blades which grow even among the thick-set lobes of prickly-pear upon the uplands, and weaving them together until a small, conical covering is made, having in one side of it a round opening to serve for a door. The location of the nest is such as to afford protection from the tramping hoofs of cattle-herds that feed upon the plains, and which carefully avoid treading upon the long, sharp spines of the cactus. There the bird rears one, and sometimes two, broods of young, which are ready for self-sustenance and flight in July.

In August, when the mating season is ended, the songs of the meadow-lark of the West are heard more rarely, and then only in the early morning. In October the bird leaves this latitude, to pass the winter months in the warmer climes of New Mexico.

—Anon.

## The Woodcock.

THE woodcock (*Philohela minor*) is migratory, universally distributed throughout the country. It commences to breed in March in the Northern States, but much earlier in the South. The nest, which is formed of dry leaves and grass, is placed on the ground in some secluded part of the woods. The average number of eggs is four; smooth, of a gray color, spotted thickly with dark brown. When first hatched the young are very comical looking things, covered with down of a yellowish color, striped and marked with dark brown or black and with a bill entirely out of proportion to their size.

It is not addicted to wading, and always resorts to rivulets and margins of muddy ground, never seeking its food in soft marshes. It obtains its food by probing the damp or moist earth with its long bill, and in this way procuring the worms upon which it feeds, swallowing great numbers of them.

In the fall the bird is generally found upon the hill-sides. When in such localities they procure their food by turning over the dead leaves and picking up the worms which have taken refuge there.

The eye of the woodcock, which is very large, bright and beautiful, is placed high upon the head, a wise provision, for the bird when feeding thrusts its bill into the ground up to the nostrils.

The fore part of the head is grayish; upper part has two transverse bars of blackish and two others of the same color, but narrower, on the occiput; these last separated by light red; a line from the bill to the eye, and one below the eye, brownish black.

The entire upper parts are variegated with ash gray, rufous, yellowish and

black. Tail feathers brownish black, tipped with gray and mottled with red on their outer edges. Under parts rufous, brighter on the sides and under the wings; under tail coverts tipped with white. Bill yellowish brown, darker toward the end. Feet flesh color.

—M. Goodman.

## A Plant Octopus.

Carnivorous plants are usually small, but European journals have been giving accounts of one of gigantic size and great power which has been discovered by Dunstan on the shores of Lake Nicaragua. As this naturalist was walking with his dog he was attracted by cries of pain from the latter, and, hastening to the rescue, he found the animal held by three black, sticky bands, which had chafed the skin to bleeding. These bands were branches of a new carnivorous plant, which Dunstan calls the "land octopus." The branches are flexible, polished, black, without leaves, secreting a viscous fluid and furnished with a great number of suckers by which they attach themselves to their victims. It might almost be believed to be an octopus transformed into a plant, from which the dog was released with great difficulty and severe injury to the hands. Among the few facts learned was that the fetid odor of the sticky liquid serves to attract prey, and it was also observed that the "land octopus," like other carnivorous plants, abandons its victims after sucking out the nutritive elements. To the natives this strange plant is known as "the Devil's noose."

Thorough investigation in India has finally proven that strychnine is not an antidote against snake poison.



## Marvels of Plant Life.

THE development of plant life is a page from the wonderland of natural history. At the beginning of a line we have microscopic plants that are difficult to distinguish from animals; at the end we might place the giant redwoods or the Colossi of Calaveras grove—trees centuries old, that tower high in the air hundreds of feet above the pines, and others that look up to them as the giants of plant life.

Giants are found in the ranks of animal life; but they do not attract so much attention nor appeal to us as abnormally large plants. I shall never forget the feeling I experienced when on the California coast range I entered an ancient grove of redwoods. The giants that probably saw the ships of Drake, and possibly the caravels of Cabullo in 1542, were gone, cut down and burned; but from the outer circle of the trunks had grown a girdle of younger trees, one hundred feet high in some cases, that stood extending their limbs and branches to the vast hollow space that once marked the interior of the parent tree. I did not measure the trunk spaces of the old trees, but each enclosure would have held a large house, or 200 or 300 people could have crowded into it.

One of the most sensational discoveries, sensational in every particular, comes from Sumatra. Some years ago several botanists were traveling through the country in search of new things in plant life, when the natives told them of a gigantic flower, describing it in such weird terms that they at first did not believe the account; but one day Dr. Arnold, one of the party, came upon the wonder. He was not only amazed, but dumbfounded, the

strange object that met his view making a profound impression upon him. Later he said: "To tell the truth, had I been alone, and there had been no witnesses, I should, I think, have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower I have seen or heard of."

Passing from the bush to some trees, the discoverer was confronted by a gigantic flower, apparently growing alone, without leaves or verdure, from the ground. The petals, five in number, were thick and fleshy, over an inch in thickness, while the center presented the appearance of a bowl from which projected curious spikes. The entire flower was nearly four feet across; each petal weighed almost three pounds, and the entire flower, if it could have been held up, would have entirely concealed the person holding it. The flower weighed, in some specimens, twenty-five or thirty pounds. The nectary alone could catch and hold twelve pints of water.

The new discovery was startling in many ways. It was a flower without leaves, or anything but the attachment to the earth—a complete puzzle—and at first it looked like a gigantic toadstool that had taken the form of a flower. Tipping one of the flowers over, it was found that it grew from a delicate leafless stem not larger than two fingers, and was, in short, a wonderful flower parasite growing and deriving its sustenance from the body of a huge vine that in turn wound about the trees of the forest.

The story of this flower was received with incredulity, but it has since been seen by many, and been named, after Sir Stamford Raffles, *raflesia*.

Palestine Oregon, Jan 5- '98.

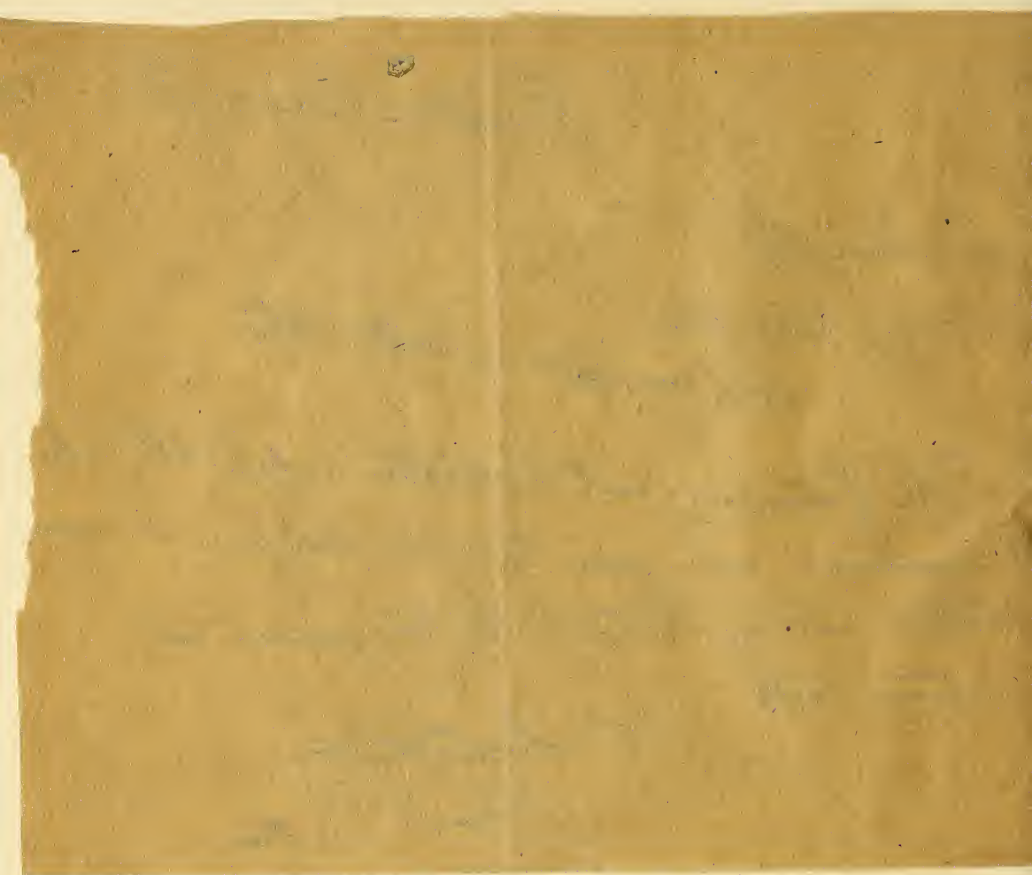
Dr. Dwight,

My Dear Sir:

All my papers are latter date.

The "Naturalist and Collector" only published  
3 numbers. In your list you ask for 4 and  
later. I buy Natural History papers. I  
return lists.

~~Yours respectfully~~  
John W. Martin





No one would have thought of finding in Sumatra a giant ally of the little "wake robin;" but such a discovery came to Beccari, and amazed him equally as much as the rafflesia of Dr. Arnold. Beccari also heard the rumor from the natives of a flower higher than a man, and which at certain times gave out an odor that was fatal to man and beast. The Italian naturalist did not believe the latter, and determined to make a vigorous search for the man-killing plant. Finally, deep in the forest, he came upon it. It resembled a lily, but a giant; and from the center of the flower rose a spadix that was six feet in height—or as tall as a large man. The stalked leaves were ten feet long, the whole peculiar plant taking up an area of forty-five square feet. The diameter of the spathe was about three feet, bell shaped, with serrated edges of a delicate green tint, while upon the outside it was a rich purple hue. The odor was not poisonous, but it was well calculated to keep both man and beast at a distance.

A few years ago a friend of Beccari, the Marchese Corsi-Salviati of Florence, presented a potted tuber of this plant weighing fifty-seven pounds to the royal gardens at Kew, England, and one night it bloomed, to the astonishment and delight of those who saw it. The plant is called the giant-arum (*amos-phallus titanum*).

Travelers who visited or passed the Cape Negro country of Africa often heard from the natives of a plant that was part spider and that, growing, threw its legs about in continual struggles to escape. It was the good fortune of Dr. Welwitsch to discover the origin of the legend. Strolling along through a wind-swept table-land country, he came upon a plant that rested

low upon the ground, but had two enormous leaves that blew and twisted about in the wind like serpents; in fact it looked, as the natives had said, like a gigantic spider. Its stem was four feet across and but one foot high. It had but two leaves in reality, that were six or eight feet long, and split up by the wind so that they resembled ribbons. This is probably the most extraordinary tree known. It grows for nearly if not quite a century, but never upward beyond a foot, simply slowly expanding until it reaches the diameter given, looking in its adult state like a singular stool on the plain from ten to eighteen feet in circumference.

When the wind came rushing in from the sea, lifting the curious ribbon-like leaves and tossing them about, it almost seemed to the discoverer that the strange plant had suddenly become imbued with life and was struggling to escape. When a description and picture of the plant was sent to England it was, like many other discoveries, discredited; but soon the plant itself was received, and to-day *Welwitschia mirabilis* is well known to botanists, and stands first among the unique productions of the vegetable world.

The giants of the grass tribe are the bamboos, and they attain a height of over one hundred feet. The rattan, which does not grow very high, makes up in length, attaining, according to Rumphius, in some instances a length of 1200 feet. The ordinary cane of commerce attains a length of 500 feet. The bamboo must have been the bean-stalk of legend, as it has been known to grow one foot in twenty-four hours in a Glasgow hot-house, and in Chinese jungles it often grows from two to two and a half feet in this time, the greatest increase being observed in the night.

Some of the palms are giants, even their leaves being enormous. A leaf of the raphia, a Brazilian palm, is seventy feet long and forty in diameter. Another genus, "*Maximiliana regia*," has leaves fifty feet long, while a single leaf of the talipot palm of Ceylon is used as a tent, sometimes covering fifteen people.

But of all the leaves that strike us as remarkable, that of the *Victoria regia* is the most phenomenal. On New year, 1873, Sir Robert Schomburg was sailing up the Berbice river when he discovered the famous lily with leaves six and a half feet across, with a rim five inches high, bright green above and crimson beneath. Large birds are often standing upon them, and one grown in a hothouse served as a raft for a child.

The seaweed includes some remarkable forms. On the south shore of Santa Catalina island the great beds of kelp form in certain places a protection, and a small steamer in which the writer made trips sometimes anchored by hauling aboard one of the enormous leaves. The *Macrocystis pyrifera* grows in Antarctic waters to a length of 200 feet, and at Kerguelen's Land it has been found growing upward to a length of 700 feet, and strong enough to hold a good-sized vessel—a veritable giant of the ocean.

—Chas. Fredrick Holder.

Considering the various methods of classifying human variations, Prof. Giuseppi Sergi finds that external characteristics cannot be relied upon, that the skeleton presents greater stability, and that the characteristics of the cranium are the most important and useful. From this he traces 16 varieties and 51 subvarieties in the human species, and believes that he has not exhausted the number.

## A Country Rich in Fossils.

The Bad Lands are a strange combination of desolation, horror and incomprehensible freaks of the primeval world. There are lofty peaks, bare and brown—baked into spires of burning rock by the hot sun of a blinding alkali that has made all that country a desert worse than Sahara ever was said to be.

The rivers run white or turbid with this alkaline concretion in winter and are dry and dusty channels in the summer. The peaks, the valleys and every feature of the whole region, in fact, seems to be thrown down upon the earth in nature's angriest mood—a hideous conglomeration, in which even the geological strata are displaced and entangled. This strange region was once the salt-washed bottom of a sea, and the traces of the receding waves are visible on every hand. The fossils, which are now our main pursuit, are mostly aquatic animals. Few birds, and those mostly of the semi-reptilian character, are found among them, while innumerable bones of gigantic saurians dot the shale and sandstone of the valleys. Mingled with them are remains of bear, antelope and buffalo and relics of an intermediate age, the bones of the mastodons and elephants—not mammoths—and of a three-toed equine, one of the ancestors of the horse. Some of the saurians of the eocene and miocene periods were indescribably hideous. Looking upon the remains of these monsters and gazing on the awful scenery of the country—a bit of hades upturned to view, one might say—is it any wonder the Indians shunned the Bad Land and said they were haunts of ghosts and the home of evil demons?

—H. Garrett.



## A Hard Year on Birds.

PEOPLE who live on the city pavements do not know the pathetic loss which the New England and Middle States — and probably the Western States — are just now suffering from the absent notes of the early spring birds. When that February cold wave went South and sent the thermometer in Georgia to 10 degrees below freezing, the lowest record for cold that State has any account of — the birds, Southern and Northern, were found dead in the various door yards and fields in great numbers. One gentleman from Georgia informed us that he discovered a great many dead mocking birds near his house, and also many dead orioles. The loss of the Florida orange orchards, with the oranges ready for the market, though it amounts to many millions of dollars, can sometime be repaired. But the loss of the birds will be felt through the whole Northern country, and is one which it will take many years perhaps to make good.

Up the Hudson the bluebird's note is in many places silent, or infrequent; and the song sparrow and the phoebe, so far as we have noticed, are in many places, and in more than one county, rarely to be heard — so that March and April saw the orchard and field and door yard voiceless to an unwonted degree.

Just as we felt assured of this unusual fact a gentleman of Springfield, Mass., who is himself a well known writer on the phases of nature, informs us that he has missed the bluebirds and many other feathered early comers of that neighborhood. Now, it is well known that the Connecticut River Valley is a favorite haunt of all our common birds, and around Springfield not less than from twelve to twenty

species of birds that are far Northern or Southern can sometimes be found.

To suffer from a depopulation of feathered tribes is not only serious and sad, but it is very uncommon indeed. What may happen when the May contingent is looked for, which includes the swallows, orioles, humming birds, the various warblers, and many others, it is too early, as we write, to determine. Let us hope that the tragedy of Killingworth, which gave Longfellow the theme of one of his most touching and beautiful poems, may not be further repeated. But there is some reason to fear it may be, as these migrants are birds of very tender habits. If the bobolink, with his breezy fountain of song, should also be missed, the clover-fields and meadows of June will suffer from the dumb transformation.

—*Frank Leslie's Weekly.*

Flammarian, the ingenious French astronomer, has been photographing the celestial pole! The position of this is constantly varying on account of the precession of the equinoxes and other movements of the earth, but with a stationary telescope its place at any particular time may be accurately determined from the circular lines drawn on a photographic plate by the circumpolar stars. On a photograph taken last September with an exposure of 250 minutes, the arcs of the paths of the stars have a length of 60.5 degrees, and the different paths closely join to give a series of broken circles around a center which represents the point toward which the earth's axis is pointed.

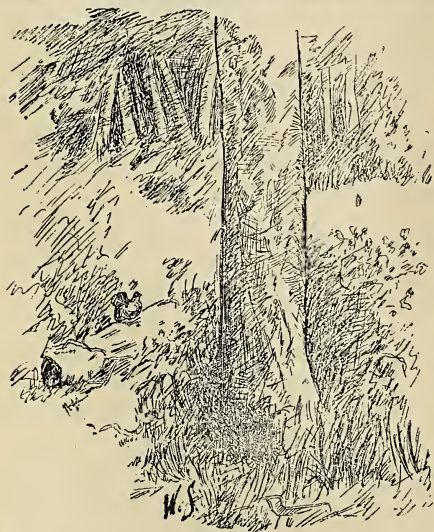
Experiments by M. Auguste Strindberg are said to indicate that sulphur, instead of being an elementary substance, is really a fossil resin or bitumen, and a compound of carbon, oxygen and hydrogen.



## The Ruffed Grouse.

**T**HE ruffed grouse (*Bonasa umbellus*) is known in various localities as the partridge or pheasant, neither of which are appropriate, it being a true grouse, entirely different from both forms with which it is confounded. It is peculiarly graceful in its movements, walking with a proud, firm step, erecting its head and opening its beautiful tail with a sudden, quick jerk; it is seen to the best advantage on the ground, where it passes the greater portion of its time.

The most peculiar habit of the ruffed grouse is that of drumming which is usually practiced in the spring, although



it is occasionally heard during the summer and fall, sometimes as late as the month of November.

When the breeding season commences, generally early in April, the male is accustomed to select the trunk of some fallen tree, to which he resorts every day soon after dawn, and again toward sunset. Mounting upon his

chosen perch he struts up and down with his head drawn back, tail expanded to its fullest extent and wings lowered till they touch the log. After passing a few moments thus employed he suddenly stretches out his neck, draws his feathers close to his body, lowers his tail and begins to beat his sides violently with his wings, increasing the rapidity of the movement at every stroke. The sound produced is not unlike the rolling of distant thunder, and can be heard for a considerable distance. The same log is chosen by the same bird many seasons in succession, unless frequently disturbed.

The nest generally contains ten to twelve eggs of a yellowish color spotted with red. The males are polygamous and desert the females when incubation commences, and do not return to the hens until late in autumn, when the young and old go together.

In color this species may be described as follows: Head and back part of the neck yellowish red; deep chestnut upon the back, interspersed with white spots margined with black; tail reddish yellowish, barred and mottled with black, with a broad subterminal band of the latter color. A yellowish white band runs through the eye; the throat and lower part of the neck brownish yellow. Feathers of ruff always most conspicuous in the male, are velvet black with blue reflections; under parts white with large spots of brownish red; under tail coverts mottled with same; bill horn color, black at the tip.

A difference is noticeable in specimens of this species, some being of a greyish hue, particularly on the tail feathers, which often have no traces whatever. The differences are not sufficient, however, to suggest a separate species, both varieties of coloring being seen in the same brood.

—J. R. Keenan.

## Collecting Eggs of the Golden Eagle.

WHILE spending a winter in the Black Hills two years ago, the writer had an adventure which might prove of interest to those interested in ornithology and its branches.

A cattle-man from the foot-hill country near Hermosa chanced to come into the bank at H—— City one day in March, and while giving us some bits of news from that region incidentally told us of an eagle's nest that he had passed on his way up to our "camp." He went on to say that the eagles had nested on a certain cliff for some years, and that, owing to the almost inaccessibility of their eyrie, had never been molested. Having myself once been an egg-collector, I felt quite a return of my former enthusiasm at his account, and determined to try to reach the nest, if only for the excitement connected with the undertaking.

Accordingly, I obtained leave of absence for a few days, and, having enlisted my friend, Mr. B——, of Chicago, in the enterprise, on the following morning we set out for the southern foot-hills and the eagle's nest. We were well provided for all emergencies, having in the buckboard, in addition to a plentiful supply of food and robes, our rifles and revolvers, several hundred feet of rope, a pair of climbing irons and a prospector's bag.

As our destination was distant 35 miles, and the mountain roads, at no time the smoothest, were then badly cut up by spring freshets, we drove through as far as a "camp" just beyond the mountains and "put up" for the night.

The next morning we took an early start, and, with better roads and fresh horses, traveled the few remaining

miles in a couple of hours, and about 9 o'clock came in sight of the nest. The "cowpuncher" had, indeed, spoken the truth in saying the eyrie was hard to approach.

A huge "butte" rose five or six hundred feet up from the plain, its sides so steep as to be almost precipitous, while on the side nearest, a creek which we had followed for several miles, was a limestone cliff sheer up and down for about three hundred feet. About half way up its face on a ledge, was the nest, a great black object, that contrasted strangely with its yellowish-white background.

We took in the situation and naturally decided to ascend the butte to a point directly over the nest. So, after unhitching and tethering the bronchos and taking out the paraphernalia, we worked our way around the butte to a side somewhat less steep than the greater part of it, and began the ascent. and after half an hour's stumbling and slipping among the icy rocks, scrub pines and cacti we found ourselves above the cliff, and as nearly as we could judge, directly above the nest. Here, fortunately, the small gnarled trees were thick, affording us a means of support.

In the meantime we had only noticed one of the eagles, a monstrous bird, that slowly sailed around only a little above our heads, but had as yet showed no signs of hostility. My friend now proceeded to tie one end of the rope securely around my chest; then, running the other end around a stout scrub, he braced himself firmly and stood ready to "pay out" the rope as needed. Thus secured against any probable accident, I carefully made my way down to the edge of the cliff and fired my



revolver. Directly the other eagle came soaring out from the cliff and began circling around, giving vent to shrill screams or whistles. We both now concluded that probably the birds would not venture to attack us and so B—— got ready to lower me over the edge. If the birds should not prove hostile everything pointed to success, for Mr. B—— is a man of great strength and the rope was warranted. So, first seeing that my bag was secured, and revolver in easy reach, I gave him the word and in another moment was dangling in the air. I at once found that the cliff shelved in almost from the top, and as in most places I could not touch the rock, I soon began to spin around slowly, which did not add to my comfort. I shall never forget the first sensation of the moment. Though I was positive that there was little or no absolute danger, yet I was in some way far from feeling secure. Suppose the strands of the rope should wear away by the friction against the sharp edge of the cliff, or that in some way B—— should for a moment lose his hold, or if this or that — and then I would “brace” and try and think of something else. First, just the bare wall of the overhanging cliff and then a momentary view of the surrounding country below and then a hurried look below me where I now caught glimpses of the nest on a broad flat ledge still some ways down. Thus, I must have gone down a hundred feet, and was just congratulating myself upon an approach to at least temporary safety, when I suddenly heard, close at hand, a tremendous flapping of wings and the next moment I received (so it seemed to my excited senses) at least a score of heavy blows on the head and shoulders, accompanied by several fearful scratches upon my head and neck.

I had been holding the rope with both hands, but now, instinctively I ducked my head under one hand and arm and with the other grabbed my revolver. I dare not look up, but realizing my somewhat dangerous position. I swung the revolver, butt end up (and it was a very heavy one), violently back and forth above my head for a moment, receiving at the same time a blow on the hand from one of the eagle's talons. This proved to be the best move I could have made, for it drove them back, and looking carefully up, I took a hurried aim and succeeded in “dropping” one of the birds, which frightened the other one away.

Meanwhile, my friend, ignorant of the true state of affairs, had continued to lower me, and just as I terminated this strange encounter, I felt my feet touch the ledge, and after resting a little, I worked my way along to the nest. It was a huge affair, fully three feet high and as many in diameter, and was constructed of sticks of various sizes, some of them as thick as one's wrist, but dwindling in size to small twigs at the top. It was almost flat, scantily lined with pieces of bark, and feathers from the breast of the female bird, and contained the eggs. The eggs, fine specimens, which I have still in my collection, measured 4 1-2 x 2 3-4 inches, and were of a cream-colored hue, irregularly marked with reddish-brown blotches. Well to bring the story to a close, after securing the eggs I gave the signal to be raised, and finally reached terra firma once more. But a sorry looking sight, with coat and collar soaked with blood from the scratches on my neck and head, and large strips of skin torn from my hands. After this we soon made our way down the butte and secured the eagle. It proved to be a fine specimen



of the Golden Eagle, well marked, and measured 7 feet 10 inches from tip to tip. Then starting for home, we reached the "camp" just after dark, tired and hungry, but well pleased with our two days' outing among the "foot-hills."

—*J. D. Gorham.*

## The Mockingbird.

The mockingbird is a true Southern gentleman of the old school—except in hospitality, of which he has none in his nature—hot temper and all. He is an aristocrat, a feudal lord; the "pink" of neatness, but never showy in dress. Punctilios and dignified, yet very easy and graceful in his manners, he is lord of his manor and will fight for every inch of his rights.

He builds his nest, usually in a thicket of brambles, of weeds and small twigs and lined with hair or cotton. Usually four eggs are laid, sometimes five and rarely six. They have a ground color of pale greenish-blue or buff, being marked with spots of various shades of brown and chesnut.

It is safe to say that a mockingbird lives and dies within a radius of two miles of its parent's nest. Once mated always mated, seems to be the rule. When they select a place and build a nest, they stick to the locality year by year, even if the place be so exposed that it is always robbed of the eggs.

He is too entirely self-sufficient to ever migrate to warmer climes. No, he had rather freeze to death declaring that his own particular home is the best and most wisely-selected on the earth than for one moment to expose his judgment in the matter to criticism.

Any Southern-raised boy can tell you where to find the mockingbird in winter; that is, if that boy has ever observed birds. Select any berry-bearing tree

or vine that retains its fruit through the winter, especially if it be a thick, thorny growth, and you will be certain to find it pre-empted by a pair of mockingbirds. They generally take possession about November 1. Not only may they be seen in or near the tree thus selected the whole winter through, but woe to any other birds that steal a berry from their estate.

While possessing a great variety of notes and wonderful powers of imitation, yet he cannot be called our finest vocalist. His attempts at the imitation of the metallic harmony of the smaller thrushes are fruitless. The Brown Thrasher has a voice far superior in sweetness, while being scarcely inferior in vigor and strength. Despite these inferiorities, he possesses a marked brilliancy in his vocal performances that makes him at once the general favorite.

—*J. R. Bronson.*

The Gardens of the London Zoological Society opened nearly seventy years ago, cover only about thirty-six acres, but contain a magnificent collection of about 2300 animals. In Berlin, the portion of the Theiergarten given up to animals embraces about sixty acres, accommodating 1500 animals. In Paris, the animal section of the Jardin des Plantes has an area of about seventeen acres, with 900 animals. The National Zoological Park at Washington, the first appropriation for which was made only five years ago, has an area of nearly sixteen acres, and the latest report gives the number of animals as 510, of which 200 are of the largest size. Several of the older collections of the United States are larger than this in the number of specimens. That at Philadelphia, with grounds of about 40 acres, has 881 animals; that at Cincinnati, occupying thirty six acres, embraces 800 animals; and in that at New York, assigned to some ten acres of Central Park, are kept about 700 animals.

## Peruvian Mummies.

**W**HILE at the University of Nebraska in the fall of '92 I had the pleasure of assisting in unpacking and examining five Peruvian mummies.

These were found in Peru, and were donated to the university by the Hon. Patrick Egan, U.S. Minister to Chili.

The mummies were found buried in the sand, surrounded by their various possessions, etc. From their appearance and arrangement it was believed that the group represented a family of the Incas.

The group consisted of a man, evidently a chief, who was dead when buried; a woman and three small children, who had evidently been alive when buried. All the bodies were in a sitting position; knees under chin; hands clasped around the ankles or shins. The bodies were all wrapped in several folds of rough native cloth, tied with the coarse cordage.

The face of the woman was smeared with a brown substance; evidently chocolate(?) which she had been eating before the funeral rites occurred.

The bodies had been buried in dry sand containing quite a percentage of Sodium Nitrate. This, with the rapid drying due to the climate, had preserved the bodies with but little decay, although a portion of the nose of the woman had disappeared; and the mummies give off a slightly offensive odor, similar to that from imperfectly preserved hides. The drying was so complete as to cause the flesh, viscera and muscles to shrink to nearly nothing; in fact the mummies look like skeletons covered with yellowish brown parchment.

With the mummies were found pipes, rough modern vessels, pottery, cordage and native cloth. Much of the native

cloth looked like burlap except that it was made of cotton; the texture was the same. As to the character of the pottery I can say nothing, as I am not an expert in that line.

—Will C. Hall.

The Great Barrier Reef of Australia extends along the coast of Queensland for more than 1100 miles, beginning at Torres Straits and reaching to Lady Elliott Island. Its distance from the coast varies between nine and ninety miles. It is a vast wall rising from the bed of the ocean to the surface, with numerous breaches, of which twenty-two are large enough to permit of the passage of ships of considerable size. *The Illustration* mentions a few of the most common of the coral animals: "The symphyllies, capable of reaching several feet in diameter, are covered with complicate meanders; the goniasters resemble human crania; the pocillipores are shaped like a cauliflower; the fungias recall huge stipeless toadstools, with gills borne upon the upper surface; the lophoseres are arranged in vertical leaves; and the madreporas resemble ramified and tufted bushes." These forms exist in colonies, each of myriads of individuals, which are continuously destroyed at the base but constantly renewed at the summit. With certain algae they form most of the reef, yet there is in addition an extraordinarily rich and varied fauna. "There are here sea anemones of gigantic size, gelatinous alcyonaries, odd mollusks, transparent crustaceans, fantastic holothurians, sea urchins with huge spines, fishes with curiously mottled sides, etc. All this little world lives, moves and reproduces itself and dies in always leaving a part of itself upon the reef to the building up and solidification of which it contributes to a slight degree."

## The Vireos of Illinois.

THE Red-eyed Vireo, (*Vireosylva olivacea*) is the most abundant woodland species, so much so in fact, as to make him a nuisance to the collector—seeking for his food continually, hopping along a branch, peering into every nook and crevice of the bark, imitating the wood warblers so cleverly that he is oft-times mistaken for other species and killed, much to the regret of the gunner.

Of his song Dr. Brewer says: "The tender and pathetic utterances of this vireo, uttered with so much apparent animation, to judge from their sound are in striking contrast to the apparent indifference or unconsciousness of the little vocalist, who, while thus delighting the ear of the listener seems to be all the while bent on procuring his daily supply of food, which it pursues with unabated ardor." His food consists of noxious and destructive insects, thus making him a welcome visitor and a most beneficial bird.

It builds a pensile nest, suspending it in a tree, at a height of from five to fifty feet from the ground. It is composed of various materials, fine pieces of barks, vegetable fibres, spider's webs and various other substances entering into its composition, the whole being glued firmly together into a cup-like structure, by the saliva of the bird. The eggs are four in number, of a white color, spotted, chiefly at the larger end, with spots of dark brown. In size they measure about .68 x .55.

The Warbling Vireo (*Vireosylva gilva*) is abundant where the forests are extensive, preferring the edges of woods and margins of streams, sometimes venturing to construct its nest in

the trees which line the shady streets of the towns.

Its nest is suspended from the end of a branch at a height of about twenty-five feet from the ground. It is a basket-like structure, composed of the stems of plants, vegetable fibres and lined with fine grasses. The eggs, which are white spotted with dark brown, are smaller than those of the Red-eye.

The Yellow-throated Vireo, (*Vireo flavifrons*) is common in the luxuriant forests of the bottom lands, and is the most handsome in plumage, as well as the finest singer.

It constructs a hemispherical nest, profusely decorated with lichens and mosses, which generally give it the appearance of a knot. The eggs are easily distinguished from others of the same family, by their rosy tint, when fresh, and by their large size.

The White-eyed Vireo (*Vireo noveboracensis*) called by the boys "Little Green Hanging Bird" or "Chicky beaver," is abundant in hazel thickets, bushy swamps and blackberry patches, continually announcing his presence by his clamorous notes, often translated by the rural population as "chicky-beaver, limber stick," emphasizing the first syllable of each word.

It is a very unsuspecting bird, allowing a near approach, often advancing nearer to get a better view, entirely unconscious of any danger. These conditions are, however, reversed when they have a nest. They exhibit great uneasiness when close to their nest, scolding all the time and uttering a peculiar, mewling sound.

The nest which is one of the most elegant specimens of bird architecture



is deeply pensive, suspended from the forks of a tree at a height of three or five feet from the ground. It is composed of lichens, fragments of insects, vegetable fibres, pieces of catapillar's and spider's webs, wrapped round and bound firmly with hempen fibres. It is lined with fine grasses. The eggs are white, spotted with reddish brown and measure .85 x .65.

Bell's Vireo (*Vireo belli*) a miniature of the Warbling Vireo, confined to the prairie districts, is rather a rare bird, probably having now disappeared entirely from the boundaries of the state. The nest is similar to that built by other Vireos. The eggs are white, spotted with red dots on the larger end and measure about .75 x .55.

We have as migrants the Philadelphia and Blue Headed Vireos. The former, being very plain in plumage, is often mistaken for some species of warbler, and so passes unnoticed. The Blue Headed Vireo passes through Illinois as a spring and fall migrant and may breed in the northern part.

—O. L. Scott.

## Darwin Vindicated.

**N**O PUBLICATION of late date is likely to excite more interest than a quarto of forty pages which has just been issued from the local press of Batavia, with the title "Pithecanthropus Erectus, Eine Menschenanliches Uebgangsform aus Java. Von Eng. Dubois, Militärarzt der Niederland Armee."

This noteworthy essay contains the detailed description of three fragments of three skeletons which have been found in the early pleistocene strata of Java, and which introduce to us a new species, which is also a new genus and a new family, of the order of primates,

placed between the *Simiidae* and *Hominidae*; in other words, apparently supplying the "missing link" between man and the apes which has so long and so anxiously been awaited.

The material is sufficient for a close osteological comparison. The cubic capacity of the skull is about two-thirds that of the human average. It is distinctly dolichocephalic, about 70 degrees and its *norma verticalis* astonishingly like that of the famous Neanderthal skull. The dental apparatus is still of the simian type, but less markedly so than in other apes. The *femora* are singularly human. They prove beyond doubt, that this creature walked constantly on two legs, and when erect was quite equal to the average human male. Of the various differences which separate it from the highest apes and the lowest men, it may be said that they bring it closer to latter than to the former.

One of the bearings of this discovery is upon the original birthplace of the human race. The author believes that the steps in the immediate genealogy of our species were these: *Prothlylobates*, *Anthropopithecus*, *Sivalensis*, *Pithecanthropus erectus* and *Homo sapiens*. This series takes us to the Indian faunal province and to the other aspects of the great Himalayan chain as the region somewhere in which our specific division of the great organic chain first came into being.

—Science.

Since 1888 the Malay Peninsula, according to M. Murtelet, has supplied nearly 30,000 tons of tin, or more than half of the world's total production. England has furnished 9,000 tons; Australia, 6,500 tons; America, Tasmania, and the rest of Europe, 13,000 tons.

## Some of Our Mushrooms.

THE growing demand for information in regard to our fungi, and the absence of suitable works on the subject have induced us to compile this article. There is a popular belief that mushrooms of vivid colors and viscid caps are poisonous, but this is not always the case. A conspicuous example is shown in *Russula alutacea*, in which the pileus is purplish-red, and various other highly colored species are harmless. Edible mushrooms are usually characterized by an odor like that of fresh meal and a flavor of hazel nuts. Poisonous species produce a biting, burning sensation on the tongue and emit an unpleasant odor. There are many exceptions to this rule, however, and the only sure way is to be able to identify each variety as met with. To facilitate the identification we give the following descriptions of common species.

ing convex near the center, viscid, covered with warts of a yellowish color. The gills are white, the stem white or yellowish, bearing a white ring or annulus. It is from five to eight inches high, with a cap from three to six inches in breadth.



*Amanita Caesarea.*

THE ORANGE.

(*Amanita caesarea.*)

This mushroom is edible, has a hemispherical cap, smooth, of a bright red or orange color, shaded with lemon yellow toward the margin, which is distinctly striate. The stem tapers slightly upward, being of a clear light yellow color, bearing a brownish ring toward the top, and encased in a large white volva. Gills of a bright lemon yellow. It is generally found five to eight inches in height.



*Amanita Muscaria.*

FALSE ORANGE.

(*Amanita muscaria.*)

A poisonous species found from June to October. The cap is ovate, becom-

GIANT PUFFBALL.

(*Lycoperdon gigantum*.)

The giant Puffball is one of the most valuable of edible mushrooms. It is

globose in form, whitish or pale yellow in color, filled with a soft white flesh which changes to an elastic substance of a yellowish-brown color. It grows to be twenty inches in diameter.

#### THE PLUM.

(*Agaricus prunulus.*)

This edible species is easily distinguished by the pure pink gills and the ringless stem. The stem and cap are white or sometimes of a light gray. It is to be found in damp woods, the cap growing to a diameter of six inches.



#### THE PARASOL.

(*Lepiota procera*)

This mushroom is very abundant in the United States and is very agreeable in odor and flavor. The cap is ovate, with the cuticle thick and torn up into scales; in color it is brownish-yellow. The stem is from eight to twelve inches in length and of the same color as the cap. The gills are white, changing finally to a flesh color with a border of brown. The cap is from five to eight inches broad.

[To be continued.]

The question of the existence of water on the moon has been studied under favorable conditions at the Peru observatory of Harvard college. In addition to the ordinary "rills," Prof. Pickering has catalogued 35 narrower ones that he regards as river beds, these objects being but a few hundred feet in greatest width and a few miles long, and therefore not easily seen. The largest has its origin in the Mount Hadley range of the lunar Appennines, follows a course a little north of west, and has a total length of 65 miles. There is no reason to believe that these valleys now contain water, but certain variable dark spots on other portions of the moon are held to indicate water, although anomalies in their positions have suggested the more improbable hypothesis of vegetation. It is stated that the changes in some of these spots—especially in the Mare Tranquilitatis—are perceptible to the naked eye.

Some startling results, stated Lord Rayleigh, the other day at the Royal Institution, have been obtained in investigating the sensitiveness of the ear to sounds. By one method he found that the ear is capable of responding to an amount of condensation and rarefaction in the air equal to one twenty-millionth of an atmosphere, though by other experiments the amount seemed to be a tenth less. A point of some difficulty is, how do we know the direction of sounds. By trial he found that pure sounds, such as those of a tuning fork, tell their direction with certainty only when at the right or left; while with other sounds, such as those of the voice or of clapping the hand, the ear could easily judge the direction, wherever it was.

Insects have a keen color sense.



## The Screech Owl.

**T**HIS IS the most abundant owl in Western New York and is one of the few birds that remain here throughout the year.

Its cry, a wierd and plaintive screech, halfway between a laugh and a moan, may be heard at any season, though perhaps more frequently in spring and summer. Many a traveler has wished himself safe at home, on hearing the notes of the Screech Owl echoing from the branches over head. Many a belated farm-boy in search of straying cows has been filled with terror at the same sound. Last August and September I was favored with a Screech Owl serenade nearly every night. They could always be heard just after sundown and again before daybreak, and often the screeching would continue all night. While I was camping at Canadice Lake, they seemed to delight in keeping up a series of moans and yells around our cabin, making sleep almost impossible.

Old orchards are a favorite resort of this owl, perhaps because the cavities and hollows always found in old apple trees afford places of concealment during the day, and the abundance of mice furnishes a supply of food. Here they may be found in the evening, perched on some dead limb, watching for mice, and now and then flying silently to another tree.

It is most often seen here during the winter, when it is driven to barns and other buildings in search of food; then it proves its usefulness by ridding the buildings of mice and other vermin.

Its bill of fare consists chiefly of mice but it is often varied with small birds, frogs, etc. It destroys great numbers of English Sparrows, which should win for it the regard of every-

one. Insects are not despised by *M. asio*; the stomach of one that I examined was filled with larvæ; I could not tell what species; another had gorged himself with grasshoppers.

The color of this owl is an interesting problem, as both red and gray phases of plumage are found, and this entirely regardless of age, sex or season. In this locality the gray phase seems to predominate; of fifteen specimens noted by me, eleven were gray; but in some parts of its range only the red phase is found. Sometimes a red and a gray one are found mated and the young, some of the red and some of the gray phase.

The nidification of this species usually takes place in March or April; though occasionally it lays as early as February, and it is not unusual for fresh eggs to be found in May. A hole or hollow in some tree is selected; sometimes the excavation of a woodpecker is used and here, on a bed of leaves and feathers, are laid from four to six round white eggs. Nests have been found ranging from five to sixty feet from the ground. The apple tree is a frequent nesting place of the Screech Owl and occasionally the nest is placed on the purline in the upper corner of an old barn or shed.

When taken young this owl makes an interesting pet and soon learns to know its master and take food from his hand.

On the whole *Megascops asio* is one of our most useful birds and well deserves our protection.

—N. Raymond Reed.

A determination by Prof. Barnard with the Lick telescope places the diameter of Neptune at 52,900 miles—from 2000 to 4000 miles less than is stated in most text-books.

## The Editor's Note Book.

*Leonata*—Are these things spoken or do I but dream?

*Don John*—Sir, they are spoken and these things are true.

*Much Ado About Nothing.*

In one of our scientific journals a few months ago, there appeared an article by a well known Naturalist, bewailing the lack of a representative journal of Natural Science, paying proper attention to mammals and other interesting, but comparatively unstudied forms of nature. To supply this deficiency and to give to the scientific world, a magazine devoted to their favorite study, scientific, but popular, adopted to the needs of the student, as well as the more advanced collector, has been our motive in launching this venture on the turbulent sea of fate.

† † †

This is an age of progress—a continual advancement. Art and literature are undergoing a revolution; what was considered correct a few years ago has been swept aside to make room for further improvement. One of the relics of antiquity is the exchange columns of our magazines. These detract from the artistic appearance and moreover, exchanges, effected through this medium are seldom satisfactory and are a positive detriment to the dealer. This along with other petrified features, will be abolished in our publication and new and fresh ones inserted in their stead.

† † †

As to the stability of our financial condition and the future of our magazine, we will simply say:—If twelve numbers as good as this one are not promptly issued we will cheerfully refund all money sent us. In placing the price at 75 cents we have endeavored to strike a medium which the

young as well as the old can easily afford. Giving each month as good matter and as much of it on ornithology as the average magazine, devoted exclusively to it and with the other extra features added you will readily perceive the advantage of subscribing to this, the cheapest, the most artistic, and most popular magazine of Natural Science extant.

† † †

With these few remarks we leave our venture to your tender mercies. It is within your power to make it a success or to send it into oblivion. With your aid we can do much, without it nothing. And now in closing we hope we may receive your encouraging words and substantial support to strengthen our tottering footsteps in the path which nature has laid before us, that we may be the more able to publish for your benefit and pleasure, and for the advancement of our favorite studies, this simple tribute to the cause of science.

† † †

We shall be pleased to have our friends send us at all times, such articles on their favorite sciences as may seem to them of interest. This magazine is to be edited by its patrons. If the branch in which you are interested is not given a place it is on account of your failure to send us articles. Photos, pen and pencil drawings of objects of natural history will be thankfully received. This issue is not to be taken as a criterion for what is to follow as it was prepared during the rush of other work.



## Morphological Classification.

THE subject of Morphological Classification although of the greatest practical interest to the true student of bird-life, is one which is generally entirely left to "authorities" and the general run of workers, taking their word as law, dismiss the subject from their minds forever, and without a second thought direct their work in other lines. Classification however is one of the first, if indeed not *the* first, object of ornithology. Without classification the world would be chaos, the mind a blank page upon which had been scribbled in indescribable confusion, the ideas and thoughts of life. So it is in the ornithological world, and without it, our chief delight, the birds, although pleasing to the eye would not satisfy the mind. Classification presupposes that there exist relations between objects, by which one can arrange them in a manner which facilitate their comprehension, by bringing together what is like, and separating what is unlike. The only real correct manner in which we can accomplish this is by morphology and founding upon it a classification based *entirely* upon form, or structure. Up to recent date, the modifications of the external parts of birds have been almost exclusively used as the basis of classification, supposing that each species of bird was a separate creation of nature. Scores of classifications have been sown in the soil of such blind error and consequently no lasting results have been attained. This idea is absurd upon the face. As if *all* parts of the structure should not be considered! As if the *internal* as well as the *external* features should not be studied! The goal to be striven for is not one to find

the most *convenient* way in which birds may be classified, but to establish their exact relationship to each other, or in other words, to trace out their family history. The classification which is now coming into universal use, viz. that of the A. O. U., is the result of years of earnest, careful study, and is an important corollary of the great theory of evolution, which by all—or nearly all—thoughtful workers is looked upon as satisfactorially demonstrated. Of course there are difficulties to be encountered in this form of classification, and the chief difficulty which the student will be confronted by comes from *physiological adaptations of structure*. By this is meant that animals widely different in the total of their characters, may present certain parts of their organism modified in the same manner. For instance, a grebe, a coot and a phalarope all have *lobate* feet, adapted for swimming; and upon this resemblance *alone*, were formerly classed in the group *Pinnatipedes*, or fin-footed birds. On deeper examination these birds are found to be *unlike* in many other respects which separate them widely from each other. The "reason why" morphological classification is so important as to *require* its adoption has been so very clearly set forth by Huxley that I trust I will be forgiven for quoting. "As a matter of fact no mutual independence of animal forms exists in nature. Every animal has *something* in common with *all* its fellows; *much* with many of them; *more* with a few; and usually *so much* with several that it differs but little from them. Now a morphological classification is a statement of these gradations of likeness which are observable in animal structures, and its



objects and uses are manifold. In the first place it strives to throw our knowledge of the facts which underlie the similarities discerned, into the fewest possible general propositions, subordinated to one another according to their greater or less degree of generality; and in this way it answers the purpose of a *memoria technica*, without which the mind would be incompetent to grasp and retain the multifarious details of anatomical science." One can not be too well assured, that no such things as species, in the old meaning of the term, exist in nature any more than have genera or families an actual existence. Species are purely and simply modifications, which once were, if not still, inseparably connected together. There is no more reason to suppose that each species of bird is a separate creation of nature, than to hold that each of the varieties of the human race is a separate production, apart from the rest of mankind, but, that during the process of evolution, they have been so influenced by their separate environments, as to cause a vast difference, not only in their structure, but in their habits as well, making morphology or the science of form, the only true and correct basis for a classification of our birds.

—C. C. Purdum, M. D.

Loss of sleep, in some of the lower animals at least, has been shown by experiments of Uarie de Manaceine to be more difficult to endure than starvation. Dogs have been starved more than 20 days and have lost more than 50 per cent in weight may recover; but dogs of 2 to 4 months of age loss of sleep for 4 to 5 days proved fatal. The temperature of the sleepless animals fell as much as fourteen degrees and food was refused during the last two days.

The origin of the Indians is one of the problems which the archaeologists are struggling with more or less success. A German anthropologist, Dr. Emil Schmidt, has recently made an attempt to put together some of the fragmentary facts known concerning the ancient inhabitants of the Mississippi valley and Atlantic coast of the United States. Beginning with the mound builders, he gives his reasons for believing them to be the ancestors of the now existing Indian tribes, and, specifying further, he thinks the Cherokees descended from the mound builders of the Ohio valley. The original seat of the Huron-Iroquois he traces to the region north of the Great Lakes and that of the Algonquin family somewhere to the north of Hudson's bay, where the Cress are now found speaking a pure and ancient dialect. These two tribes, he thinks, moved slowly southward, driving the mound builders from Ohio and penetrating into Virginia. There they met the Dakotas and a fierce war resulted in which the latter were almost entirely destroyed. The Gulf States were peopled by the Muskogean tribes coming from the south. Of special interest is the much debated question whether in this country there was a palæolithic or "rough stone" age. Dr. Schmidt, from the evidence at hand, takes a negative view on this subject, leaving room for the inference that the appearance of the ancestors of the Indians on this continent is of comparatively recent date.

— Exchange.

"Opaline laminee" is a new vitrified material, which can be made into plates of any size and used for decorative tiles. It is made from 54 per cent of silica, 39 per cent of baryta, and 7 per cent of soda.

## The Pocket Gopher.

THE pocket gophers of North America are thick-set animals about the size of a rat, with small eyes and powerful forefeet armed with strong curved claws. Their name is obtained from their large cheek pouches for carrying the roots and plants which form their food. Food not needed for immediate use is carried to their burrows and stored in the chambers there for future consumption.

The localities inhabited by these small animals are marked by little mounds of earth called "gopher holes," extending along the lines of their subterranean tunnels. Each mound contains five or six quarts of earth, and, considering the great number of these, the gophers, working all summer and part of the winter, must be very busy little creatures. They cause great damage to the farmer by the amount of potatoes, carrots and the like which they destroy.

Two species of gopher inhabit the United States. The gray pocket gopher (*Thymomys talpoides*) inhabits Montana and the Dakotas, pushing into the northwest part of Minnesota. It is solitary in its habits, it being seldom, except in the breeding season, that more than one is found in a mound. The red pocket gopher (*Geomys bur-sarius*) differs from the preceding one by its larger size and reddish color and by the grooves on its teeth, and its larger forefeet and claws. It inhabits the Mississippi Valley, extending from the Red river to Texas, where it merges into another species.

There is little difference between the mounds thrown up by the different species, except as one would naturally expect, the mounds made by the smaller animals are smaller and closer together.

After an extended acquaintance with both species they can be distinguished by their mounds. In their habits and food they closely resemble each other.

—R. C. Rice.

Gem-stones are far more numerous than is commonly supposed, observes Mr. H. A. Miers of the British museum, although they often pass muster under erroneous names. Tourmaline is sold as ruby, cinnamon stone as jacinth, with jaron and phenacite as diamond, while green garnets are universally known in the trade as olivine or peridot. That the varieties of available gem-stones are not far more numerous is due mainly to the prejudice of purchasers, who ring the changes on diamonds, rubies, sapphires and emeralds, and have heard of nothing else; estimating the stones, as the public estimates popular actors or authors, not by their real excellence, but by their names. In the mineral gallery of the British Museum are many examples of cut stones which have rarely or never been employed in jewelry, but should certainly win favor on their own merits. One very curious example is a little gem cut from a crystal of the ordinary tin-stone, the same ore which is worked for tin in the Cornish mines. This is a stone which, when cut from a sufficiently transparent crystal, possesses a most beautiful luster and color. Another example is a single rough fragment of stone from the ruby mines of Burmah, which has puzzled many but has been proven by scientific tests to be the boro-silicate of lime known as Danburite, and whose appearance leads to the belief that it would make a beautiful gem.

Chrysolites have been unearthed in the Cumberland mountains.



## A Study of Wildcats.

**W**ILDCATS, even here in the forests of the Atlantic slope, are more abundant than is generally supposed. They have learned to dread man and to keep out of his sight and hearing, and away from the keen scent of his trained hounds; hence they are seldom seen. But all our broader forests, even those within fifty miles of the great cities, include among their wild population a fair percentage of *felis rufus*, as the zoologists call him. Surpassing even the wily fox in secretiveness, the wildcat, if he were not possessed of a certain courage and independence, especially when feeding, would be almost as common in our forests as the ground squirrel.

With a fur quite valuable to the trapper, and with too great readiness to walk into a baited snare or to take to a tree when hunted by hounds, he is much more likely than the fox to fall before the hunter's rifle. He is, at the same time, more sensitive than Reynard to the encroachments of man upon his chosen haunts. He more boldly attacks the farmer's fowls or sheep, or even his small calves; and, having killed his prey he often stands by it defiantly until discovered and shot. These characteristics of wildcats account for the fact that they are becoming far less numerous near our older settlements.

The ability of this animal to elude the observation of man, when not feeding, is truly wonderful. He once learned to fear the Indian, who could send from a distance a sharp-pointed arrow into his vitals. How much more must he dread the white hunter's long-range rifle! Conscious of his own prowess, and relying upon his formidable equipment of claws and teeth, he

knows at the same time that he is no match for that other destructive creature, who walks erect through the forest with a powder-and-lead-loaded weapon over his shoulder.

Indeed, the wildcat shares this feeling with every other brute inhabitant of the forest. But, unlike many of them, when suddenly approached by the hunter, he disdains a precipitate and cowardly flight, and only trots leisurely to the nearest brush and crouches there within a few paces of his enemy. Or perhaps he springs into the fancied security of a tree, not realizing the far-reaching and death-dealing power of the rifle. Whatever his retreat may be, he must turn more than once and look back with cat-like stare at his pursuer, and then is the deadly shot delivered.

But, except on these rare occasions, the wildcat remains entirely out of man's sight and hearing. His crouching attitudes, his gray-mottled and reddish-brown coat, closely resembling in general color his background of dead leaves and mossy rocks, render him invisible so long as he remains motionless.

Observe our domestic puss when prowling in the garden, intent on bird hunting, and notice how skillfully she manages to keep out of sight and hearing. Every movement is made with the utmost caution, every advantage of ground or vegetation is made use of, every disadvantage is estimated, and, if possible, avoided. Yet this is a creature in whose veins flows the blood of many generations of household pets, and from whose nature much of the original wildness has been eradicated.

The wildcat is tenfold more cautious and watchful, and when we consider



the almost impenetrable thickets and secret rock covers that abound in our deeper forests it is a wonder that even the hunter's sharp eyes can ever discover his presence. Nothing but his occasional defiant moods can betray him.

I have never heard the cry of the wildcat except at night, and experienced hunters tell me that it is seldom uttered in the daytime. When hunted with dogs and driven to bay in a narrow thicket, from which he can not escape without running the gauntlet, the cat seems to know his danger, and sometimes utters shrill and piercing cries, intensely expressive of rage, defiance, perhaps of despair. His ordinary calls are not unlike those of the domestic cat, except that they are longer drawn out and naturally have more volume. Yet so seldom are these cries heard that the wildcat may almost be called a silent member of nature's family.

As a fighter this cat has no superior, and with the exception of the larger members of the weasel tribe such as the badger and the wolverine, he has no equal at twice his size. The feline race are endowed by nature with weapons superior to those of all other carnivora—those terrible claws provided with sheaths, and thus kept sharp when not in use. Our wildcat, though no larger than a beagle hound, probably possesses twice the muscular force and agility of any dog, and can, in fair battle, soon make the pluckiest and strongest hound draw off whipped. Two powerful dogs may kill a wildcat but never without sustaining severe injuries. Yet, under ordinary circumstances, and if not disturbed while feeding, the cat will take to a tree when chased by a dog, and will show fight only when brought to bay.

—*Philadelphia Times*.

Dwarfs in Africa were mentioned by Homer, referred to as an historical fact by Herodotus, and described by Aristotle. Pliny, a later writer, speaks of the pygmies as living in different countries. These references were substantially all that was known of the African pygmies until a few years ago, when accounts of them were first given to travelers by neighboring tribes, then they were seen by Schweinfurth, and specimens were finally brought to Europe. M. A. de Quatrefages, the eminent anthropologist, finds that the ancients had information, more or less real, concerning five populations of small stature. Two were located in Asia; a third to the south, toward the sources of the Nile; a fourth to the east, not far from these; and the fifth in Africa, to the southwest. Two of these groups, more or less modified by crossing, are still located in Asia. The African groups are farther away than the traditions represent, but in nearly the same direction. All of them are fragments of two race of blacks—those of Asia, Malaysia and Melanesia to be distinguished as Negritos, and those of Africa as Negrillos—both including tribes, distinct persons and sub-races. The Negritos, contrary to a common belief, are not an approach to the "missing link," but are people of some development.

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From experiments made some time ago, Prof. A. König calculates that 160 hues or colors can be distinguished by the normal eye. About 660 degrees of brightness can be detected between the just visible and the blinding.

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The Aqua marine, a variety of beryl, has been discovered in North Carolina.

## The Deseret Museum.

THE Salt Lake Literary and Scientific Association is a body corporate, under the laws of the Territory of Utah, with headquarters at Salt Lake City. The association is the proprietor and promoter of the Deseret Museum, a depository of choice and extensive collections in the field of natural history and ethnology. Under the auspices of the Deseret Museum, the wonderful selenite formation in Wayne county, Utah, has been worked, and of the magnificent crystals thus obtained upward of fifteen tons have been gratuitously distributed to museums and other institutions of learning throughout the United States and in Europe. The specified purposes of the association are the promoting of study in literary and scientific subjects, especially the encouragement of the pursuit of natural history, including ethnology and the formation and preservation of museums and libraries.

For the better carrying out of the association's objects, a building has been recently erected and equipped in Salt Lake City. The structure is of pressed brick, with gray sandstone trimmings; is 90 feet in length and 67 feet wide, comprising three floors and a basement. A central tower rises on the west or front side. This is utilized on the top floor for meteorological work. Regular courses of evening lectures have been conducted during the past year and class work has been carried on during the day. A limited number of students has been admitted to the day classes, with the privileges of the laboratories; but the evening lectures are open to the public, with proper restrictions.

In the basement is situated an effi-

cient heating and ventilating plant, toilet rooms, storage rooms for chemicals, chemical apparatus, and mineralogical material, and a commodious assay room. The main lecture hall, 66 by 32 feet, has its principal entrance on the first floor, the seats being terraced, to give from all parts a view of the demonstration table. This table is provided with commodious pneumatic trough, gas, electric wires from primary and storage battery, and numerous other facilities, and for lectures without demonstrations a movable platform is placed behind and on a level with the table. The wall in front of the audience is used in place of a screen for stereoptican projections. On the first floor are also three smaller lecture rooms and an office.

The second floor is entirely devoted to physical science. A small lecture room is provided with a demonstration table, similar to that in the main room, and an extensive series of charts occupies a frame behind the table. A laboratory for general chemistry, 33 by 32 feet, and another for analytical work, 32 by 25 feet, are on this floor.

The laboratory rooms are excellently lighted, and the tables are set diagonally, so that no worker intercepts his neighbor's light. A combustion table covered with asbestos mill board and provided with blowpipe and blast, an anvil and other appliances, are conveniently located in each room.

The apparatus room, contains a main case, 25 feet by 9 feet high by 5 feet deep; two corner cases, each 9 feet long and of height and depth corresponding to the other. The apparatus constitutes a particularly full equipment for demonstrations in natural philosophy and in general and analytical chem-



istry. The physical lecture and chemical apparatus for demonstration alone has cost about \$15,000. The curator's private laboratory is very completely fitted up for analytical and general work. It contains a well equipped working table, a table for blowpipe analysis, and a corner table for occasional work with the microscope, hoods with automatic burners, cupboards, etc. A balance room adjoining the private laboratory gives protection to two pulp and pharmaceutical balances, a Becker long arm analytical, a Sartorius short arm analytical, a Troemner assay balance, and a Mohr specific gravity balance. These are mounted on marble slabs, carried by iron supports independent of the floor. The curator's private office, an assistant's laboratory, and a dark room complete the apartments of this floor.

The third floor is occupied wholly by the museum. The stair landing carries two upright cases, in which is an excellent display of the finest of the selenite crystals taken from the Wayne County geode. The main room extends the entire length of the building and is 32 feet wide. It holds thirteen upright floor cases, and wall cases along one entire side. This room is devoted mainly to mineralogy and geology, though some cases are occupied by shells and corals. Two other rooms are given up to zoology and ethnology respectively. At present the catalogue shows upward of 3,000 mineralogical and lithological specimens; a thousand paleontological specimens; 500 vertebrate preparations, whole or parts; 2,000 invertebrate preparations; and nearly 1,000 ethnological specimens. The Desert Museum enjoys the distinction of having been admitted to membership in the Museums Association. It sent an officer to the London

meeting of this association in 1893, and expects to be similarly represented at the approaching Dublin meeting set for June, 1895.

—*Scientific American*.

## Sleepy Grass.

In some parts of New Mexico there grows a grass which produces a somniferous effect on the animals that graze upon it. Horses, eating this grass, in nearly all cases sleep standing, while cows and sheep almost invariably lie down. It has occasionally happened that travelers have stopped to allow horses to feed in places where the grass grew pretty thickly, and the animals have had time to eat a considerable quantity before its effects manifested themselves. In such cases horses have gone to sleep on the road, and it hard to arouse them.

The effect of the grass passes off in an hour or two, and no bad results have ever been noticed on account of it. Cattle on the ranches frequently come upon patches of this grass, where they feed for perhaps an hour, and then fall asleep for an hour or more, when they wake up and start feeding again.

The programme is repeated perhaps a dozen times, until thirst obliges them to go to water. Whether, like the poppy, the grass contains opium, or whether its sleep-producing property is due to some other substance, has not been determined. — *Pearson's Weekly*.

Mr. Fredrick V. Colvill, Botanist United States Department of Agriculture, says: "The so-called sleep grass is technically known as *Stipe viridula robusta* and is known from reliable to have a narcotic effect on horses and other stock."

—*Scientific American*.



## Indian Funeral Trees.

**A** REMARKABLE specimen of the red cedar was recently unearthed by the opening of the Metzgar Indian Mound, on Deer Creek, near Yellow Bud, in Ohio. A large bed of ashes a quarter of an inch in thickness, covered a space of about ten feet by six. Near the edge of this ash bed a large log was found. It was about five and a quarter feet in circumference, and as sound as if buried but a few years ago. The side branches had been cut away from the log, and one of the scars was so perfect that the marks of the stone axes used in the work are plainly discernible. There are no cedar trees now growing nearer than ten miles from that immediate neighborhood, and none were there growing when the early settlers came, so that the trees must have disappeared from there long ago in the past or the improbable alternative accepted that the log was brought from a long distance. Evidence was furnished that the log was originally about eighteen feet long. Right beneath the log was a skeleton of a human being. A small pen had been made of small cedar saplings, arranged in the form of a tepee around the large log. The skeleton was about two feet below the original surface of the ground, and the earth forming the mound over the skeleton had a depth of about thirty-four feet from the summit. The earth to form the mound had evidently been brought in baskets by manual labor, as the "dumps" in some cases, formed by different tinted materials, could be distinctly seen. The circumstances favorable to the preservation of the cedar log had evidently aided in preserving the skeleton, and it is possible the size of the log had some relation to a

distinguished personage. The body had been laid straight under the log, with legs extended and arms at the sides. Around each wrist were two bracelets, made of native copper, and several hundred shell beads were around the neck and on the chest. It is believed that the dry ashes with which the body had been covered, in addition to the great depth from the surface, had aided in preserving the log as well as the human remains. Even traces of hair were found around the skull, as well as dried and shriveled portions of the brain were found, while rude clothing and matting, as well as buckskin, put over the corpse before the ashes, were in a fair state of preservation. As the use of the cedar log would seem to have been a matter of choice, it opens a new field for speculation as to the possibility of the tree having had some special significance in the funeral ceremonies of the Mound Builders. A section of the log has been secured for the museum of the Academy of Natural Sciences, of Philadelphia—the exploration, indeed, having been made under the auspices of that body.

—*Scientific American.*

Amethysts are widely distributed in the United States, being found in New England, in the Lake Superior region, in Virginia and North Carolina, in Georgia and several of the Western mining states. Some specimens discovered in Connecticut rival in color and lustre the best variety of the oriental gem.

Very fine specimens of the chrysoberyl a stone almost equal in brilliancy to the yellow diamond, have been found in New York, Virginia, North Carolina and Georgia.

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ABINGDON, ILLINOIS, JULY, 1895.

NO. 2.

## The Dicksonian Fern.

(*Dicksonia Punctilobula*) MCHX.



It was one of his favorites, and is often mentioned in his journals. Other writers on out-door topics seldom mention this fern, although it is one that we should naturally expect to find mentioned wherever mountain scenery is described. Those who have seen the *Dicksonia* in its native haunts will readily agree that its beauty is not easily exaggerated; it is doubtless our most beautiful fern. Others may surpass it in stature, but none can equal it in delicacy and gracefulness.

What the bracken is to English moors, the *Dicksonian* fern is to the mountains of northeastern America. Although it is to be found growing in thickets and woods of our low-lands,

HOREAU, when it can only be seen at its best amidst the wildness and grandeur of the mountain solitudes. Here it at once becomes noticeable—a distinct feature of the landscape. Slightly changing Scott's lines to the lady fern, we may well say:

"Where the copse wood is the greenest,  
Where the fountain glistens sheenest,  
Where the mountain dew lies longest—  
There *Dicksonia* is strongest."

Few ferns take such possession of the soil. Many large areas on the mountains are almost given up to it. For miles upon miles in all directions it is spread, the principle under-growth in open woods; adding its share to the tangle of bush and briar in the thickets, and fringing every rock and boulder in the mountain pastures. As our eyes wander over such a scene, the old poet Twomley's stanza comes into mind:

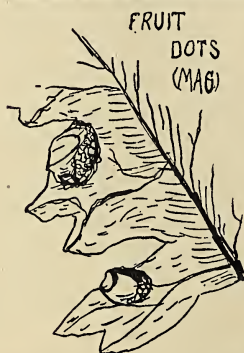
"Oh, then, most gracefully they wave  
In the forest, like a sea;  
And dear as they are beautiful  
Are these fern leaves to me."

The *Dicksonia* is often called the fine-headed mountain fern, its grace-

ful, feathery fronds making the name particularly appropriate. Another of the common names is hay scented, or sweet-scented fern, given in allusion to the fact that the foliage, when bruised, gives off a strong, sweetish odor, akin to the smell of new-mown hay. The fragrance is frequently noticed as one walks through the ferny dells. This should be the true "sweet fern."

The rootstalk of the mountain fern is slender and creeps extensively, sending up its handsome fronds at short intervals all summer. These are lanceolate or spear-shaped in outline, and are apparently endlessly divided. In reality, each frond consists of about twenty-five pairs of pinnae, which gradually decrease in size as they approach the apex. Each pinna is divided into nearly fifteen pairs of pinnules, and the latter are again divided into as many lobes, which are toothed at the apex.

The under side of the frond is minutely hairy and glandular, the latter organs doubtless producing the peculiar odor of the crushed frond. There is no noticeable difference between the fertile and sterile fronds of this species,



indeed, the sori are so small that one has to look rather closely to see them at all, and a magnifier of some kind is necessary to show them to perfection. Then it is seen that

a reflexed toothlet of the ultimate segments, usually on the upper side of each lobe, is holding fast a tiny green

cup, in which the spore-cases are piled. The illustration shows two sori, much enlarged. The sori in nature are scarcely larger than the spore-cases as drawn.

The genus to which the *Dicksonia* belongs was named in honor of James Dickson, an English botanist. There is but one species in North America, and this is found only in suitable situations, from Canada to Tennessee, and from New England to Minnesota. There are upwards of fifty species of this genus scattered throughout the world, principally in warmer countries. The majority of them are arborescent, or tree ferns. One of the tree-ferns most commonly seen in cultivation belongs to this family, and is called *Dicksonia antarctica*.—*Popular Science News*.

**S**PELÆOLOGY is the name given by M. E. A. Martel to the study of caves, and a spelæological society has been organized in Paris for promoting this study. M. Martel has explored several hundred caves, finding them to be natural depositories or museums capable of throwing light on many subjects. In their quiet recesses layer after layer of deposits have formed, sealing up the story-telling relics left by occasional visitors, by inundation and by percolation.

**A** COMBUSTIBLE clay has been found in the suburbs of Baku, and has been used by the working people as fuel for some months. It is burned in the form of powder, and gives a bluish flame of great intensity and without the least smoke.

Almost every variety of corundum has been discovered in North Carolina.

The opal has been found in Mexico.



## A Cicada Year.

PROFESSOR HOWARD showed the correspondent of the *Inter Ocean* his time table, which indicates the future movements of every kind of insect in the country. Since the locust, or more properly the cicada, never has failed to return exactly thirteen or seventeen years, as the case may be, after its former appearance, this schedule may be depended upon as most accurate. The eggs which hatched out this year's crop were deposited in thousands of trees throughout the territory of the last outbreak, and thus the exact location of this year's plague may be correctly prophesied, although no doubt these buzzing armies will overrun their former battle ground after they appear.

Its common miscalling is due to a general confusion of the periodical insect with the annual locust of the East, which differs little in form from the American grasshopper. Thus the grasshopper is more properly a locust than is the cicada. There is but one genus in America which may correctly be called a locust. This is the Rocky Mountain locust, or "hateful grasshopper," which inhabits the arid plains east of the Rockies. In 1877 Congress appointed an entomological congress to report on this insect, whose propensities for destruction are famous throughout the world. The cicada differs materially from the locust in shape. The former has a thick body, with short, straight legs, while the latter is slender and his hind legs are long and hinged high above his back, like those of the grasshopper. The Old World locusts, inhabiting Northern Africa, Western Asia, and Southern Europe, have been known to swarm in such thick clouds as to ex-

clude the rays of the sun for many square miles. They are also said to have stopped the flow of rivers by swooping down into them and damming the currents with their dead bodies. But the cicada was never known to celebrate in this way, although there are traditions to that effect. It is strictly an American insect, having been well known to the Indians long before the time of Columbus. The most serious depredations committed by the cicada are the hacking of the branches and the gnawing of the roots of trees. The former is done by the female, which plows the young bark while planting her eggs, and the latter by both sexes, during the underground stage.

The cicada's strange notion of living underground during the greater part of its life, and of afterward coming up to the surface to grow wings and die after only a few weeks, makes it one of the greatest curiosities of the lower animal kingdom. The seventeen and thirteen year individuals differ only in respect to the length of their underground periods. That the southerners mature much earlier than do the northerners is undoubtedly due to climatic differences. On observing a swarm of cicadas one will notice that half of them are about two-thirds as large as the remainder. This difference in size has caused the mistaken supposition of many people that the larger are the males and the smaller the females. They always live together, have common habits, lay their eggs in the same trees, and eat the same food. There is another incorrect theory that the small ones are the youngsters of the brood, but in reality every cicada in a swarm is of the same age.



The only difference in the appearances of the two classes, besides size, is the coloring of the body. The larger are tinted with orange-brown both on the back and under side, while the smaller have no additions to their natural shading. The singing of the cicada is all performed by the male, who grates his raspy legs against sonorous drums beneath his wings.

The laying of the mother's eggs, the part of the season's pastime which the tree lover most rues, occurs during the latter weeks of summer. These eggs are tiny white beads, almost too small to be seen separately with the naked eye. Having been nourished by the sap for six weeks, each egg hatches out, and soon the branch of the tree is covered with infinitesimal insects, which run about with great activity. Occasionally there comes a gentle zephyr which bends the cradle bough, and causes many of the babies to fall off. After this sudden departure from the tree they float to the ground, like so many small flakes of down. Then they burrow deep into the ground, until some sappy roots are found. Here they remain for thirteen or seventeen years, according to their brood, being nourished by the roots in question. During this stage they have no wings, and their bodies are dusky brown. When at last arrives the summer when they are due upon the surface of the earth nature seems to sound a signal in the underground world. As the hot weather approaches they continue to dig toward the upper air, when suddenly, on a bright June morning, daylight appears.

The thought of life in the open air is at first distasteful, so they continue to throw the earth up before them into strange little towers, about four inches high, which resemble inverted icicles

in shape. A hole is made in the side of each tower, and occasionally a peep is taken out into the strange world which has not before been seen for so many years. After becoming used to the light shining in this way they all appear to pluck up courage and decide to suddenly march out in single file, the males taking the lead. Reaching the trunk of a tree, usually the same which nourished the mother's eggs, they make their way toward the top, remaining scattered on the bark until after sunset. Then between 6 and 9 o'clock a strange reincarnation takes place. They jump out of the old brown skins, which are ripped up the back and left clinging to the bark. The new, glossy raiment appears and wings are suddenly grown. Thus the old family tree is used first as a cradle and nursery during the matching season, afterward as a means of nourishment, and later as a place of preparation for the aerial life.

The cross ribs on the transparent wings of the cicada form the letter "W." The old-time farmer who does not understand about the periodical advents of the insect believes that this forewarns war. It was in 1861, the first year of the late war, that the present seventeen-year brood made a former appearance in the West. Some say that the superstition originated at that time. However, as a noted entomologist has pointed out, "warm weather" is the best interpretation. The Arabs find on the wings of the Oriental locust a message stating that the deity has sent the insects from heaven as avenging armies to destroy the crops of the wicked.

Professor Howard says that the cicada's depredations are much exaggerated. The matured female causes all of the injury to trees when she

plows the bark while laying. The young, wingless insects sometimes puncture the roots of trees during the underground stage, but this rarely results seriously, owing to their meager capacity for food. In former "locust years" farmers have reported to the agricultural department as to their various attempts to avert these destructions. Lye, whitewash, sulphur, carbolic acid, and many other chemicals have been spread over the trees and surrounding ground without avail. About the only remedy which proved successful was in the form of an ounce of preventive.

As soon as the mud towers were found one farmer turned all of his hogs and chickens into the threatened ground. The cicadas were almost all devoured as soon as they came out. In one orchard where this experiment was tried a hog was found dead, having overglutted himself, while the eggs of several hens were poisoned. This, however, was an exceptional case, as hundreds of the cicadas were coming out of the ground at once.

There has been considerable argument among "bugologists" as to whether or not the cicada can sting. Most of the wounds commonly attributed to it are really made by wasps, which prey upon the larger insects, and which may often be seen holding fast to them in flight. The long bill through which the cicada sucks its nourishment contains no poisonous glands. Professor Riley, curator of insects in the National Museum, says that he has handled hundreds of cicadas, and has seen children play with many of them, without ever a sting or a bite.

This same entomologist has also eaten these insects, after the time-honored custom of the East, where "wild locusts and honey" were the

food of the gods. He fried them in oil, after detaching the wings and legs. In Arabia the Oriental locust is pounded into flour for bread, while all throughout the East locust eating is a fashionable luxury. In some places are to be found locust shops, where dead locusts are sold by measure. Professor Riley, however, did not find the American cicada particularly relishable.

Up to recent years there was a general supposition that cicada's eggs were poisonous. Many people living in sections invaded by a periodical brood refused to eat fruit during that season because the female frequently lays her eggs in apples, berries, and the like. It is, however, denied by good authorities, that there is any poison whatever in the cicada egg.—*Inter Ocean*.

#### A Distinction.

AN ACCURATE definition of the distinctions between plants and animals applying to the lower organisms as well as to the higher, is yet to be supplied. Prof. Charles S. Minot suggests the following: "Animals are organisms which take part of their food in the form of concrete particles, which are lodged in the cell protoplasm by the activity of the protoplasm itself, plants are organism which obtain all their food in either the liquid or gaseous form by osmosis (diffusion)." This, however, is not entirely free from objection. At one stage the myxomycetes, unlike any other plants, take solid particles of food very much as do the amœba, and even with this line of separation we may be compelled to recognize a connecting link between the two kingdoms. The tapeworm in the intestine appears to be nourished entirely by absorption; but this is an exception induced by parasitical life, as its near relatives take solid food.



## Wilson's Snipe.

(*Gallinago Wilsoni.*)

IT is distributed throughout our country, extending its migrations northward during the summer far beyond the limits of the United States. They go to the southern States, where they pass the winter, in the months of September and October, and return again in March and April, rarely halting to breed within the United States.

In Nova Scotia, where it frequently incubates, it begins to lay its eggs in June, choosing the swampy grounds as most suitable for the purpose, since there it is not liable to be disturbed, and also as it is in such spots that it is surrounded by an abundance of its favorite food.

The nest is a mere hollow in the moss and in this are deposited four eggs with their small ends down, olive in color, thickly spotted with light and dark brown.

The young are at first covered with down of a brownish tinge, and leave the nest as soon as hatched, feeding at first upon such small insects as they may find upon the surface of the mire, until their bills have received sufficient strength to enable them to probe deeper into the ground, at which operation they soon become very expert.

In the western part of the United States the English snipe arrives from its breeding ground in the north during the latter part of September, and immediately seeks the meadows, the banks of the rivers, and the borders of ponds. Often in such localities they are to be met with in great numbers, the ground seeming to be alive with them, as they rise when disturbed in flocks from six to thirty or more.

When they take wing they utter a

grating noise resembling *scaipe*, *scaipe*, and should the day be windy they will fly in an irregular zigzag course, very trying to an inexperienced marksman, until they are nearly out of gunshot, when they proceed in a more direct manner. If they should be wild, as is almost always the case on rainy, boisterous days, at the report of a gun, dozens will rise in all directions, and many of them, after performing a very eccentric flight, sometimes high in the air, will pitch headlong with great velocity, frequently upon the same spot from which they arose, and soon disperse in search of food.

Snipe shooting is preferred by many to any other of our field sports, as it is always followed in open ground, no trees or bushes intervening between the marksman and his game, and the birds are among the most delicate of all those of our feathered game. But it also has its drawbacks, the principal one being, that it frequents swampy treacherous ground, *through* which the sportsman is obliged to force his way, and it is no uncommon occurrence for him to sink nearly up to his waist in mud and water when striving to reach better ground, or to pick up a bird just killed. On warm, bright days the snipe will often lie with greater pertinacity, and enable a good dog to point them, thus allowing a large number to be killed; but at other times it does not lie well, generally taking flight at a distance of twenty or thirty yards ahead of the dog.

The snipe walks easily and lightly, carrying its bill inclined downwards, and as soon as it finds a suitable spot thrusts it several times in quick success-



ion into the soft ground in search of its customary food. Having in this way exhausted one place, it seeks another, until its appetite being satisfied, it remains quiet until nightfall, when it flies about without fear of harm. The number of holes observed in the soil is an indication whether the snipe are plentiful or not in the locality, and their appearance readily indicates whether or not they have been recently made.

The food of this species is chiefly ground-worms, insects—sometimes a leech will not be passed unnoticed; and according to some authors, it will eat the juicy, tender roots of different vegetables. Although the marshy grounds are its usual resort, I have, on different occasions, met with this bird in the fall upon the uplands, but never in any numbers. I suppose, when frequenting such situations they obtain their food in the same manner as does the woodcock, by turning over the dead leaves and seizing upon the insects which may be beneath.

Wilson, the poet-naturalist—pioneer of American ornithologists—was the first to observe the difference between this bird and the European species, (to which, indeed, it bears a close resemblance) and therefore it is known to the scientific world bearing his honored name.

Great numbers of these birds are annually killed during their spring and fall migrations, and, as they are highly esteemed in our large cities, they are always in great demand. During the winter it is found often in large flocks on the wet grounds of Louisiana and other of the Gulf States, and the rice plantations of South Carolina are also a favorite resort.

In the spring, when mated, the two birds are accustomed to mount high in

the air about sunrise, and sail around each other with great rapidity, producing a curious rolling sound, caused, probably, by the air passing swiftly through the feathers of their wings.

The snipe is rather a prettily-marked bird, having on the upper part of the head brownish black bands, separated by narrower ones of light brown, and another of the same color running from the bill over the eye. A loreal band of dark brown, chin white, and neck reddish brown, the outer edges of the scapulars being yellowish white. Wings similarly mottled, outer edges of first primary white, some of the coverts also tipped with the same. Rump and upper tail coverts crossed with yellowish, brownish red and black bands. Tail feathers black, tipped with reddish, and with a subterminal black bar; outer feathers frequently white and barred with black. Under parts white, barred on the abdomen sides, and under tail coverts with brownish black. Bill brown, darkest at the end. Legs dark brown.

*R. Cliff Rice.*

AN early dawn or twilight sound in the Indian forests is the cry of the land lizards. Mr. S. E. Peal, of Sigsabar, Assam, states that these are  $3\frac{1}{2}$  to  $4\frac{1}{2}$  feet long, and that their cry can be plainly heard a mile away. The native name is "Gui," which is precisely the sound it makes.

DR. W. L. ABBOT, who has been traveling in Central Asia, has forwarded to the National Museum at Washington a collection of the skins of 288 birds and more than 100 mammals. The greatest number of these are species new to science.

The largest diamond ever found in this country weighed over 23 carats,

## Geographical Distribution of Plants and Animals.

A TRAVELER, journeying through a strange country, one in which the animals have not been so dispersed by civilization as to form an unelidable and complicated system, is at once struck by the diversity of the characteristic animals and plants inhabiting the different parts of the same province; even under the same conditions of altitude, climate, moisture etc., widely diversified species are represented. Why two places having the same climatic conditions have come to possess widely different faunas and floras, even when separated by no perceptible barriers, is one of the most interesting, yet, withal, one of the most difficult problems that science has endeavored to explain.

The most powerful barrier to the dispersion of species is the unelasticity of parts. The main reason why animals do not readily adapt themselves to different degrees of moisture, heat and cold, is that their delicate organisms are not sufficiently plastic to readily admit of a change. Man, and his ever faithful friend, the dog, are the only animals that can readily adapt themselves to extreme degrees of temperature. The more highly developed the man is, the more readily does he adapt himself to climatic conditions. A savage is more susceptible to a change in temperature and exhibits greater discomfort when out of his native region, than do the higher civilized races of men. The longer an animal has been domesticated, the more readily can it adapt itself to changes. The dog is not as susceptible to and is not as greatly influenced by a change as are the various animals

which have not been as long in a state of domestication.

The conditions under which an animal lives while domesticated, as well as its food, etc., produces an elasticity of parts, enabling them to undergo a series of changes without being seriously affected. This condition, although at first very slight and admitting of but slight changes, has been transmitted according to the laws of heredity, strengthened in each successive generation, till after many centuries it has become a positive inheritance.

The first question in regard to the distribution of plants and animals, would naturally be concerning the barriers to their dispersion.

The most effectual barrier to the free migration or dispersal of animals is naturally that presented by the oceans. The animals on opposite sides of the Pacific are entirely different; while in but a few cases are two identical species found on opposite sides of any ocean, these few, no doubt having been brought over in vessels at a comparative recent date. Difference in climate also presents a great barrier. The animals inhabiting the tropics being totally unlike those of the frigid regions. Mountains frequently act as a barrier; the difference in the humidity of the air restraining animals of delicate organisms from crossing their summits. The majority of the animals between the Rockies and the Sierra Nevada differ from those of the prairie lands east of the Rocky mountains. Civilization has proven a great barrier as well as a means of dispersal. Animals of solitary and secluded habits have been compelled to move westward



as the tide of civilization has advanced. As a country becomes civilized some plants furnishing food for various animals have been destroyed and these animals were consequently compelled to seek new regions or eventually become extinct. Deserts act as barriers. Few animals can stand a journey across them, thus compelling different faunas on their opposite sides. Rivers sometimes act as barriers, but often aid in the dispersal of small crustaceans, mollusks, etc.

A most powerful means of dispersion is the ocean currents. By means of great currents, seeds are carried onto various islands, and there growing, have developed a fauna where otherwise it would of necessity have been barren. The tropical marine animals sometimes follow the Gulf stream into climates, which were it not for this stream, would be almost arctic, and here venturing to quit the stream, have been merged insensibly into the range of other species.

Trade winds play an important part in scattering the minute forms of life. Whirlwinds and tornadoes often gather up small insects and transport them to other climates. Birds are sometimes blown off shore in wind storms, for hundreds of miles, and being unable to return have settled down and populated the remote islands of the sea. Drift-wood often furnishes transportation for small animals from shore to shore and also conveys seeds and vines which are upon it. Birds, when blown to distant islands often carry seeds in their crops, which soon develop a fauna upon which they feed. Darwin quotes a case where seeds have been disseminated by means of dry earth clinging to the feet of partridges. Many other cases of accidental or occasional means of dispersal are known, but the

foregoing are the most prominent and most frequently seen.

For convenience, the earth has been divided into various faunal districts. The one expounded by C. Hart Merriam, of the U. S. Dept. of Agriculture and published in the annals of that department, is selected as being the most convenient, and is given below.

He divides the country north of the tropics into six life zones. These are grouped under two heads: The Northern or Boreal, and the Southern or Astral. In eastern North America, these zones are described as follows:

THE ARTIC ZONE or the zone above the limit of tree growth, is characterized by the dwarf willow, saxifrages, gentians, Arctic poppy, etc., and by the snowy owl, snow bunting, polar bear, arctic fox, and reindeer.

THE HUDSONIAN ZONE, comprising the northern or higher parts of the great trancontinental coniferous forest, numbers among its inhabitants the wolverine, moose, great northern shrike, cross-bills, white-crowned sparrow, and fox sparrow.

THE CANADIAN ZONE, comprising the southern part of the coniferous forest, has among its list of inhabitants the porcupine, red squirrel, varying hare, white throated sparrow, yellow rumped warbler, and many others.

THE TRANSITION ZONE, covering the northwestern part of the United States and part of Canada has the oak, hickory, chestnut and walnut. Here the southern mole, the rabbit, oriole, thrush, catbird, bluebird, chewink, live in or near the haunts of the hermit and Wilson's thrushes, solitary Vireo, bobolink, red squirrel, chipmunk, star-nosed mole, etc. The zone is one in which the outlying Boreal and Astral elements overlap and produce a fertile agricultural region.



THE CAROLINIAN ZONE embraces the states of Illinois, Iowa, Ohio, Indiana, and the states west of the Mississippi as far as Colorado. Here the tulip tree hackberry, sassafras and persimmon first appear. The opossum, gray fox, squirrels, Carolina wren, tufted-tit, cardinal, gnatcatcher and yellow breasted chats are residents of this region.

THE AUSTRUPARIAN ZONE includes the states of Louisiana, Mississippi, Alabama and parts of the adjoining states. Here are found the painted bunting, mocking-bird, chuck-wills-widow, red-cockaded woodpecker, etc., and the cotton rats, wood rats, little spotted skunks and fur-tailed bats abound.

THE TROPICAL ZONE, farther to the south is restricted to southern Florida and southeast Texas. The tropical trees grow here such as mangrove, dogwood, royal palm, and mahogany. Among the birds are found the Zanaida dove, white-crowned pigeon, quail doves, Bahama honey-creepers, caracara eagle, Bahama vireo, etc.

These zones are divided and subdivided into provinces, which would prove not only disinteresting, but too complicated for the general reader, so they are omitted and only the primary divisions given

*Henry O. Scott.*

### Meteors as Satellites.

ASTRONOMERS conceive it to be possible for the earth, under certain circumstances, to capture as satellites some of the roving meteoric bodies known to be numerous in space, instead of bringing them to the surface as aerolites. As these bodies are too small to be seen,—a mass of 100 tons being invisible at 800 or 1000 miles when brightly lighted,

the earth may actually be attended by hundreds of invisible moons. Sir J. Hershel was even of the opinion that such moons do not only exist, but that they may be large enough to be visible for brief intervals when beyond the earth's shadow; and Sir John Lubbock has supplied formulæ for calculating the distances from observations of this kind. M. Petit, director of the Observatory of Toulouse, has been led by observation and calculation to conclude that the earth is attended by at least one meteoric stone of considerable size. It is about twenty-six times nearer than the moon, its orbit being about 5000 miles from the earth's surface or 9000 from the center; and the tiny moon revolves around the earth in three hours and twenty minutes.

### The Oldest Book.

THE Papyrus Prisse, found by Prisse in a tomb of Thebes and now in the National Library at Paris, is thought to be the oldest book in existence. The tomb contained a mummy of the first Theban dynasty, dating back twenty-five centuries before Christ; but the book is much older, its title page proclaiming it to be of the time of King Assa, who lived about 3350 B. C. The book is divided into forty-four chapters, written in hieratic rhythmic language. It contains a series of maxims and sayings, directing those in authority to perform all their duties as perfect men, taking wisdom and science as guides, and to be modest, moderate and careful not to abuse their powers. The author describes himself as 110 years old, and possessed of all honors and favors to be conferred by Egyptian royalty.

Zircon has been found in California.

## The Blackbird in Winter.

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Poor bird! my heart is truly wae,  
Forlorn to see thee wand'rin' sae,  
Whar ilka thing's thy mortal fae,  
E'en heav'n's vice-gerent—  
Unfeelin' man—he awaits to slay  
Thee like a tyrant.

Aft times whan e'enin' frae her den,  
Staw saftly up the dewy glen,  
I've seen thee far frae treach'rous men  
Thy sonnet singin',  
While loud resoundin' to thy strain  
The groves were ringin'.

But ah! the times are sadly chang'd;  
The leafy forest where thou rang'd  
Clean bare by gurlie winter scraing'd,  
Nae bield it yie's  
An' hunger makes thee quite estrang'd  
To open fiel's.

In hoary mist wi' biting breath,  
Stern winter reigns in gloomy wrath,  
Though calm the air yet fraught wi' death  
It brings starvation,  
An' thou maun seek, to scape the scaith,  
Some 'ither station.

Alas, before the cottage door,  
In humble mood thou's fain to cow'r;  
Though bawdrons crouching to devour,  
An' riddle traps,  
Await thee still, thou looks them o'er  
For antrin scraps.

Yet ah! in this thou's no thy lane;  
Thy fate is aft the fate o' men,  
Wha in their actions fair an' plain,  
Nae guile expect'd  
Till driv'n on knaves quite unforseen  
They're fairly wreck'd.

Happy thy fate compar'd wi' their's;  
Returnin' spring shall end thy cares,  
But ah! nae, changin' time repair  
The broken heart;  
Still weepin' recollection tears  
Wi' double smart.

*From an Old Poet.*

## Some of Our Mushrooms.

(Continued from last month.)

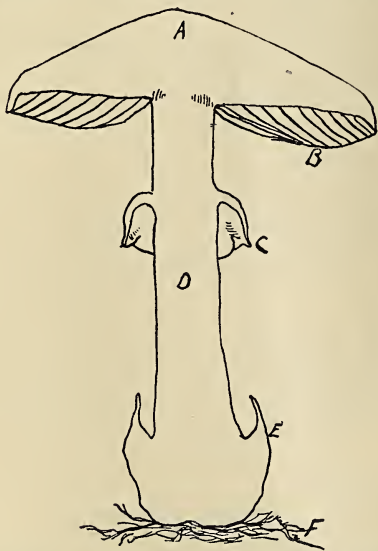
SINCE the first installment of this article was published, many inquire, relative to the technical terms expressed therein, have been received. We have endeavored to make the article as free from technical terms as the subject will allow, but have been forced to use a few in the descriptions. The subject being one so badly neglected that the few terms connected with it are understood by but a few, we have endeavored as plainly as possible to give an explanation of the most important and

which envelopes the plant as a membrane when in the embryo state. It is of such a delicate texture that it sometimes disappears without leaving any trace on the adult plant. Otherwise, traces of the Volva are left upon the cap, numerous and thick, sometimes irregularly disposed on the surface as warts. It leaves at the base of the stem a sort of wrapper, sometimes thick and ascending, in others a mere border or a few scales.

The Veil consists of a membrane extending from the margin of the cap to the stem, protecting the gills. It is generally white, soft, cottony, sometimes even powdery. It exists intact only in the youth of the plant. In the adult plant it is not visible but as the cap expands the membrane stretches and finally breaks, leaving in some species a sort of ring or zone on the cap and stem.

The mycelium or spawn is the delicate thread proceeding from the germinating spores. It is usually white, but is sometimes yellow and rarely red. Its presence is difficult to detect without the aid of a microscope, because of its delicacy and its being intermingled with organic tissues in which it has developed. It is distinguished by some authors as nematoid, fibrous, hymenoid, scleroid, and malocoid, but this, not being necessary for classification, we will omit.

The gills or lamellæ are the vertical plants radiating from the stem, on the under surface of the cap. In the *Polyporei* the gills are replaced by pores or tubes. The tubes are with cylinders, pressed one against another, constituting a fructifying membrane. The end is always closed, while the



A, cap or pileus.—B, lamellæ or gills.—C, annulus or ring.—D, stipe or stem.—E, the volva.—F, mycelium or spawn.

common ones. All terms and words used in description have the same meaning as when used in *Phænogamous Botany*.

The Volva is the egg-like process growing at the base of the stem and



opposite end is free to admit of the exit of the spores. The tubers are usually joined together. The species of the Hyrdi, are conical elevations having the appearance of points or spines formed by the substance of the cap upon which they are attached. They are covered with a membrane.

The annulus is the ring found around the stem of mushrooms. It is situated in various positions and is often absent.

The Pileus or cap is the fleshy process at the top of the stem. It is sometimes torn up into scales, is viscid and presents many changes, occasioned by the gills, veil and various membranes.

The following species have been selected as presenting the greatest diversity in form and structure.

*Cortinarius caeruleus*.

In this species the pileus is fleshy, of a blue color; gills, pure blue. The stem is also blue and has a marginal bulb. A fine filament extends from the margin of the cap to the stem. The skin is viscid when moist. It is most frequently found growing on stumps and is edible.

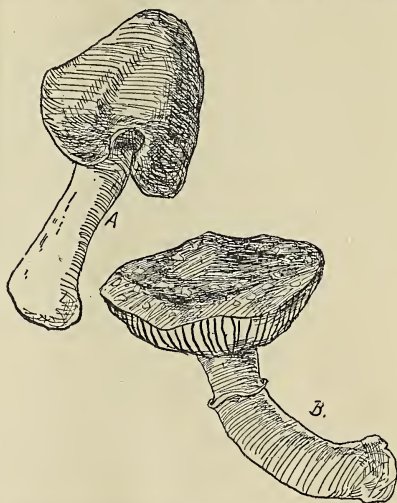
*Hygrophorus conicus*.

The "Red Juice" mushroom is poisonous, and is found growing on old stumps in pastures and by the roadsides. It possesses a strong and very unpleasant odor. The flesh is juicy. The top is of a crimson or deep orange color; the stem of a dirty hue and is hollow. It has a bitter taste.

*Agaricus aeruginosus*.

The "Verdigris" mushroom has the

pileus fleshy, convex-plano in shape and covered with a green mucus. The stem is long, hollow and scaly, tinged



A—*Hygrophorus conicus*. B—*Agaricus aeruginosus*.

with blue. The gills are brown, tinged with purple. It is very poisonous and quickly decays. The top is about three inches in width.

*Cortinarius turmalis*.

This mushroom is edible, has a convexo-plano cap, which is viscid when moist and is of a ochraceous-yellow color. A veil extends from the margin of the cap to the stem, in delicate arachnoid threads. The stem is cylindrical, white, three to four inches in length. The remnants of the veil appear above the middle of the stem as a minute zone, darker than the stem. The gills are of the same color as the cap, emarginate and decurrent.

*Agaricus campestris*.

The cap or pileus of the "Meadow Mushroom" is fleshy, white, or tawny, sometimes brownish. The gills are of a pink color, becoming deep brown with age. The stem carries a well

marked volva. The cap is adorned with minute silky fibrils. It grows in grassy places in fields and pastures and is highly esteemed as an esculent.

*Agaricus arvensis.*

Allied to the meadow mushroom is a species, sometimes growing with it, but does not possess the excellent qualities of it and is said by some to be poisonous. It is larger, and turns to a brownish-yellow when bruised or broken. The cap is smooth and very white; the gills are dirty brownish-yellow, becoming dark brown. It has a big, ragged, floecose ring, and the pithy stem is usually hollow.

*Russula heterophylla.*

The "Variable" mushroom is well-known on account of its sweet, nutty taste. Its gills are white and sometimes branched; flesh, white; stem, solid, white, and ringless; top, firm, variable in color; the thin, viscid covering of the pileus is commonly subdued green, but at one time approaches greenish yellow or lilac, and at another, gray, or obscure purple. The top is at first convex, becoming concave. It is a highly esteemed article of diet.

[To be continued.]

A NEW micro-organism is reported by Dr. F. J. Thornbury to be found in fifty out of the 1,000 hogs inspected daily at the government abattoir at Buffalo. The organism is a peculiar fungus, having the form of bundles of threads of various colors. It belongs to the saccharomyces or yeast group, and has peculiarities of growth contrasting in many respects to other organisms. The blood of infected animals is heavily laden with the fungus, which proves fatal to rats and white mice within twenty-four hours after inoculation.

## The Whippoorwill.

THINKING the readers of your valuable paper might be interested in regard to the nest and nesting habits of that rare bird, the Whippoorwill, a bird not so rare as it is difficult to find, I will try and describe the finding of the bird and nest. In the first place I am not an egg collector, but a collector of birds, and occupy the position of Taxidermist in the Museum of the University of Michigan. The morning of the 7th of May at 4 o'clock, our Curator, Professor Worcester, and myself started for the Warbler Woods, two miles from Ann Arbor, for specimens. It was a warm, rainy morning and almost too dark to shoot when we arrived at the woods. We soon separated, Professor Worcester going to the left, while I kept to the right of a small thicket, when suddenly from my very feet flew a bird that from its color and irregular flight, I at once identified as the Whippoorwill, *A. carolinensis*. Carefully looking over the ground I saw the nest and its one egg. The nest was in a slight depression, and was composed wholly of leaves carelessly placed. Wishing to test the habit this bird has of returning to the old nesting place, I took the egg with the thought of coming in a few days for the other one, and if possible, the bird. But it was not until the morning of the 16th of May, that the Professor and I again made a trip to the "Woods for Warblers." It was a clear, beautiful morning and the birds were singing in the tree tops, but my thoughts were on the spot where I expected to find "Poor Will." I carefully approached the site of the old nest. Nothing but leaves rewarded my search. Just at the edge of the thicket I saw a bird and shot it. In hand it



proved to be a fine specimen of Alice's thrush, *T. Alicia*, but I was disappointed at not finding the nest. I turned back and circled over the ground and on the side of a small hill four rods from the old nest, I flushed once more the same bird. Keeping my eyes fixed on the spot from which she rose, I again saw her nest, and the second and last egg of her set—this egg was slightly incubated. I placed the egg in an envelope and pinned it to a tree to mark the spot, then turned my attention to the bird, which I could not find. After an hour of warbler hunting and securing fine specimens of Blue Goldenwing and Magnolia among others, I returned to get the egg I left on the tree. On nearing the spot I again flushed the bird that had already returned to her nest, and this time I was ready for her for she fell at the report of my trusty old Parker—a victim to the grand science of Ornithology. She may be seen as big as life, if not as natural, in my office at the U. of M., and her set of eggs in the Museum collection.

Norman A. Wood.

### Sinking Wells Through Rock.

AN account of the sinking of wells in granite and other crystalline rocks, where water is not generally supposed to exist, has been given to the Paris Academy of Science by M. Norden-skjold. Certain pilot and lighthouse stations in Sweden have been troubled by the lack of a suitable water supply. From the fact that water had been found in deep bore-holes on rocky islets, Nordenskjold concluded that temperature changes produce shearing stresses between surface rock and that lower down, forming horizontal fissures into which water must percolate from the surface. It was believed that this water

would be fresh, as the water reaching iron mines extending far under the sea is never saline. Acting on this theory, a well was last year sunk in the island of Arko to a depth of 100 feet below sea level, when a horizontal fissure was encountered, from which was obtained a daily supply of 4,400 gallons of perfectly fresh water. Similar wells in other localities yielded water at a depth of 110 to 120 feet. The rock in each case was granite, gneiss or diorite, and the wells—2½ inches in diameter—were bored by diamond drills.

### A Curious Feature.

WHAT is pronounced by Prof. Heilprin one of the most interesting features of the earth's surface, on account of its unique development and extraordinary persistency, is the discovery of Dr. J. W. Gregory, of the British Museum, in Eastern Africa. It appears to be a great crack or break in the earth's crust, resembling the lunar rifts that have so mystified astronomers. This remarkable depression communicates with the basin of the Red sea, and even the Dead sea and the Valley of the Jordan, and runs southward almost to the Cape as a deep and narrow valley, occupied partly by the sea, and by salt steppes and old lake basins, and a series of over twenty lakes, only one with an outlet to the sea. For 150 miles or more, from the Great Nyanza to beyond the first degree of south latitude, could be traced a parallel-sided valley, from 20 to 25 miles wide, with steep walls, 800 to 1,000 feet high.

BY PLACING a film of spores under the solar spectrum—thus producing a photograph of the spectrum in living and dead bacteria—Prof. H. Marshall Ward has shown that the rays of sunlight that kill microbes are the blue and violet.



## The Editor's Note Book.

*Leonata*—Are these things spoken or do I but dream?

*Don John*—Sir, they are spoken and these things are true.

*Much Ado About Nothing.*

It is with pleasure that we again greet our friends in a typographical form designed to be so strikingly artistic as to need no special comment. Since our first number was issued many replies and queries have been received, relative to our paper, and in commendation of our efforts. For all kind words which may have been said in our behalf, we are truly thankful. When we undertook the publication of this journal, it was, indeed, not without doubts as to its financial success, but the numerous replies and liberal patronage received, have assured us of its future success. There need be no fear of its succumbing as it is founded on a firm basis. To make our magazine the nearer realize our highest conceptions, we need your hearty co-operation. To make it all that we desire it should be, will require more than our efforts alone. Your efforts at aiding us, if not more than saying a favorable word about us to some interested friend, however slight this effort may seem, when joined with the efforts of others, will form one mighty wave of sympathy which will eventually overcome all the obstacles in the way to the elevation of our class publication.

† † †

For the past few years our publications have been entirely too conventional. "Variety is the spice of life" and nowhere more so than in a magazine. A style adopted and rigidly carried out, in time, becomes monotonous. A conventional style of writing and typography appears

in the journals to the exclusion of what, while not necessarily of a superior nature, but which nevertheless occasionally inserted would form a pleasing contrast to the stiff form of modern scientific articles. The general run of articles as published are of a too ultra-conventionalistic scientific form. Nothing appears in what may be termed an Oologist's monthly, but simply staid, time-worn descriptive articles. Were a few short, but timely articles on the new discoveries in the various fields of science occasionally inserted, they would form a pleasing feature of what is otherwise so conventional as to be almost unbearably monotonous—they not diminishing the interest in the particular branch to which the magazine may be devoted—but only refreshing the wearied mind and making the leading articles more enjoyable by the change. A short poem, or story with Naturalistic tendencies helps to brighten the often too dry pages of a scientific magazine, and awaken new interest in literary fields—so necessary to a full comprehension of the more intricate and philosophical branches of science. We shall endeavor to keep the NATURALIST AND COLLECTOR out of the rut of conventionalism and while not approaching impressionism to make its pages attractive and interesting to all who read it.

† † †

Our next issue will be approximately what the conceptions of our readers deem a magazine should be. It will be the most interesting number of a Naturalist's magazine ever published.

Besides the continuance of articles in this number it will present illustrated articles by Dr. Morris Gibbs, Will C. Hall etc.,—these names alone being a sufficient guarantee of its value. To those who may wish this number separately, it will be sent on receipt of a silver dime.

† † †

Owing to the lateness of the issue of our June number those living in remote districts, may have been debarred from taking advantage of our clubbing offer with the Museum. For this reason we will extend the time indefinitely, so that, all who so desire may have the privilege of accepting this remarkably cheap offer. This offer does not, as you know, include the "giving away", of cheap supplies or worthless specimens as premiums, but includes two of the most neat, artistic and interesting publications now issued. This issue, together with the preceeding one, while it has not reached the standard which we wish it to maintain, gives a general idea of its character and the contents. The "Museum," considering the short time it has been published has met with phenomenal and unprecedented success. The fact of its rapidly increasing circulation indicates the position of esteem which it holds with the naturalists of our country. It gives each month thirty-six or more pages of valuable reading matter on the subjects of botany, ornithology, geology, etc. The regular price of the Museum is one dollar per year and is well worth more. The price of this paper is seventy-five cents, but for a short time only, we will make a special price of both for one dollar. Remember, in accepting this offer, you do not get a supply of worthless specimens, but two of the most popular and meritorious journals

that are at present issued—something that will remain standard as long as the natural sciences are studied.

† † †

As our advertisements in the naturalists' papers appeared so close to the time of the appearance of the June number, we will extend this time also. Till August 15th, we will receive subscriptions to the NATURALIST AND COLLECTOR at the advance rate of fifty cents; in clubs of four, only thirty-five cents—less than half the regular price. At this price you will be getting what is pronounced by everybody who has been fortunate enough to receive a copy, to be the best publication of its kind ever issued. All should avail themselves of this offer at once, as it is made for but a short time. All who have previously sent in their subscriptions at the regular rate will have their time extended to eighteen months. As we state in another place, please do not send stamps. Simply cut a hole in a piece of cardboard, insert money, paste paper over both sides and send at our risk.

† † †

On account of the necessary delay in issuing the first number, we are compelled to change the date of publication. Rather than combine two numbers as is the usual resort, we have decided to change the date of publication from the first to the fifteenth of the month. We trust this arrangement will be satisfactory to our readers.

ON HEATING minerals in a vacuum and examining the gas thus obtained, Prof. Norman Lockyer has already found about sixty spectral lines that are believed to be new to terrestrial chemistry. Several unknown gases are indicated.



## Notes on the Ornithology of Texas.

[From Report of Sennet in 1878.]

### CURVE-BILLED THRUSH.

(*Harporhynchus Curvirostris*.)

THIS thrush, by some called the "gray curve-billed," reaches into our southern border from Mexico. Its nearest relative, Palmer's thrush (var. *palmeri*), and other curve-billed forms of the genus, are found in the higher altitudes of New Mexico and Arizona. The northern limit of this thrush is not fully determined, but it can be considered common in Southern Texas, and most common between Fort Brown and Ringgold Barracks, along the river. Here great alluvial deposits produce berries and insects in abundance for food, and tangled thickets, as well as great prickly-pear cactuses, afford cover and breeding resorts. In 1877, I collected from Hidalgo down to near the mouth of the river. On this trip I collected most of the time at a point several miles above Hidalgo, in the heart of the greatest growth of timber to be found on the river; and it was there that I found the curve-billed thrush more numerous than ever before. In point of numbers it nearly equalled the mockingbird and long-billed thrush. The three species comprise all the representatives of the family observed by me during the trip. The curve-billed thrush in color some what resembles the mockingbird, and in the bushes, where other characteristics are not readily distinguished, may be taken for it at short range. This species, like the long-billed, is usually more fond of dense cover than the mockingbird, and while not often found in the heaviest timber, yet will be found in the thickets common on the edges of such tracts. In open

woodland, where clumps of tall thorny bushes and cacti surround the scattered trees, it is always found, and usually in company with the long-billed thrush. I did not obtain many fresh-plumaged specimens. By the first of April, the plumage becomes faded and worn; and, by the latter part of May, moulting begins. About this time, also, the small black fruit or berry of the como-tree, upon which the bird feeds, ripens, and it becomes almost impossible to shoot and prepare a specimen without the plumage becoming stained with the purple juices which issue from the mouth and vent. I brought home only five birds, but over forty sets of eggs.

In nesting, the habits of this species vary to suit the locality. In districts where chaparral covers the country, there is no respectable growth of timber, but now and then openings, principally occupied by prickly-pear cactuses and stunted mesquite-trees, and here their nests will be found in cactuses more frequently perhaps than in trees. But at Lomita I found five nests in trees to one in cacti. Though usually suspicious and wary, this bird is wonderfully bold at times in choosing sites for its nest. In my notes of 1877 I mention a nest with four eggs taken from an outhouse, in the center of a village. At Lomita Ranch, close by a large and much frequented gateway, stand a young ebony tree, from which, in plain sight, and some twelve feet from the ground, I took a nest and four eggs in April of the following season, and on May 20, I took a nest and three fresh eggs, at a height of fourteen feet, in a large ebony, close by a pathway on the edge of a cornfield.



These were the highest nests found, and in both instances the birds were as tame as robins. Nests are seldom found lower than four feet from the ground. The last nest I examined, just before leaving the ranch, was a very bulky one of this species, which I had seen built in the place where, a number of days before, I had destroyed the nest of a mockingbird, after its young had departed. It was situated on the lowest branch of a small tree near the house, entirely exposed to view, and standing upon a chair, I was able to look into it. It was just completed and ready for the eggs, and I did not disturb it. The second nest was much larger than the first, but composed quite similarly of thorny twigs, and lined with a few grasses. This fearlessness is exceptional, but indicates that, were the country thickly settled, this bird might become as domestic as the mockingbird or robin. It is resident where found, commences to breed in March on the Rio Grande, and rears several broods in a season. The first is hatched in April, and generally numbers four. By the middle or latter part of May, clutches for the second brood are full, and consist nearly always of three eggs. I have taken, however, a few sets of four from the second laying.

The eggs vary in shape from oblong oval to almost pyriform; the ends are round-pointed, and the greatest diameter nearer one end. The color is pea-green, covered more or less over the entire surface with fine brown dots. Of the large series of eggs taken, only one set was comparatively free from spots. A set of over-sized eggs, taken May 24, average 1.25 by .83. The general average is 1.12 by .79. The shell is not particularly fragile, unless incubation is well advanced, in which case

it becomes so tender that it is almost impossible to prepare a fair specimen. The color becomes dull and faded when the egg is long incubated, so that its condition can generally be known without handling.

#### BLACK-CRESTED TITMOUSE.

(*Lophophanes Atrocristatus*.)

This tit, so far as is known, is found within our limits only in Southern Texas, where it is abundant and resident. The most northern records are San Antonio, by Dr. Woodhouse, and Comal county by Mr. W. H. Werner (see Mr. Brewster's paper in April No., 1879, of Bull. Nuttall Orn. Club); the most western is Fort Clark by Dr. Heermann. As no mention is made of it in Mr. Lawrence's papers on "Birds of Western Mexico," it is probably confined to the Gulf slope of both Mexico and the United States. The only form of the family of Chickadees or Titmice, besides this species, thus far observed in Southern Texas, is the yellow-headed titmouse (*Auriparus flaviceps*). The specimens *L. wollweberi* and *L. inornatus*, so far as our knowledge goes, are confined to the higher altitudes of Arizona and New Mexico. The family seems to be unnoticed by Mexican collectors (with the exception of Mr. Xantus, who records that he found *A. flaviceps* at Cape Saint Lucas, (as I mention in my remarks upon that bird), and the geographical distribution of the various species south of our border is as yet unknown.

I mention the different forms of the same genus found on our southern border to show how distinct are those of the Lower Rio Grande from those of the Upper Rio Grande and Colorado valleys; the one nowhere intruding upon the habitat of another, unless it may be in the case of the yellow-

headed tit, *A. flaviceps*. Nor are the lines of geographical distribution less noticeable in other families of birds, the thrushes varying quite as distinctly in different localities along the border.

During this trip I saw more of the black-crested tit than on the former one, owing to my being more favorably situated to study it in its haunts. On arriving at Lomita, one of the first familiar birds to greet me was this Titmouse. It was one of the very few birds of those found in numbers on the former trip, whose eggs I did not obtain, being successful only in discovering a nest with young. It was essential to find its nests without delay on account of its commencing to breed earlier than any other species found in this locality. Orders were given to shoot none of this species, but to search diligently the trunks and stubs of trees for nests. In a few days, several nests were found, all containing young. It was a great pleasure to me, therefore, when, on April 20, my assistant, Mr. Sanford, placed upon my table a nest, five young, and a perfect egg of this species, together with the parent bird caught on the nest. The chicks I preserved in spirits; the egg, being infertile, was easily prepared; and both, together with the nest and bird, are in my collection. This, I believe, is the first thoroughly identified egg of this bird brought to scientific notice. The bird taken on the nest was a male, and other males were shot having bare and wrinkled bellies, showing that both sexes share in the incubation and care of the young. The nest was situated some six feet from the ground, in a hollow limb of a half-dead willow, which was leaning on some brush, and was discovered by the bird's flying into its opening. It lay some ten or twelve inches from the

opening, and is composed chiefly of wool intermixed with strips of soft inner bark, and now and then bits of snake-skins; the whole being much firmer and thicker than is usual with nests that are built in hollow stubs. All the other nests found with young were situated higher, with one exception; the distance varying from four to twelve feet from the ground. I found them to occupy usually the abandoned holes of the Texas woodpecker, *Picus scalaris*; but split forks of trees were sometimes put in use. They prefer living trees to dead ones, and in every case in my experience the opening had to be enlarged, sometimes with difficulty, before examination of the nest could be made. The localities mostly selected for nesting are groves or open timber free from undergrowth, whether in old lagoon beds, which receive the overflow from the river, or on the driest knolls. They do not avoid human habitations, as two nests were found on the ranch in ebony-trees, near buildings much frequented. The parents guard their treasures well, and are much disturbed when the nest is invaded; though not until they see that their nest is actually being handled do they give any cry of alarm, or other intimation of uneasiness than their near presence.

Like all of their kind, these birds are very active and busy; but at the time of their rearing their young, I have sat and listened to the male well up in the tree above my head, singing his whistling refrain for an hour at a time. A nest near the house was laid open with broad cuts of an axe, and the young left fully exposed as on a shelf, but the old ones reared them safely, and I saw them take wing.

The egg is rounded oval; but one end, being larger, has the appearance of being rounder than the other. The



ington, I received from Mr. Bourbois, at Lomita, a nest and four eggs of this species, taken about April 1, 1879, on his ranch. The nest is smaller and more frail than the one I obtained, and composed of about equal parts of fine inner bark and wool, with which are intermingled many bits of snakeskins. Of its location I have not yet received notes. The eggs were fresh, and vary much in size and markings. The ground-color is pinkish-white. The spots of reddish-brown are small and few in number, and scattered over the greater part of the egg, but at the larger end they are large and numerous, covering nearly the whole end, though in no case forming a ring. In shape they are round at one end, and round-pointed at the other, with the greatest diameter near the centre. Their sizes are respectively .70 by .55; .69 by .55; .63 by .54; .60 by .46.

In Mr. Brewster's notes (Bull. Nut. Orn. Club, vol. iv No. 2, April, 1879, page 76), the measurements given of the three eggs in Mr. Ricksecker's collection are considerably larger than my single specimen described at the head of this article, and previously given in "Science News," vol. 1, No. 4, p. 57. But, by comparison with the sizes of the present set, it will be seen that my first egg was not so great an exception in size as Mr. Ricksecker's eggs would lead one to suppose. It will be noticed that the largest egg of my set of four is still smaller than the smallest of his, and that of this last set of four one is even smaller than the one I obtained in 1878.

#### CACTUS WREN

(*Campylorhynchus Brunneiicapillus*.)

On my former trip I did not find a single one of this species between the mouth of the river and Hidalgo. On this trip, about seven miles above Hidalgo, where the foot-hills begin, I

found it not uncommon in certain localities. The limit of this bird's habitat in the United States is, on the east, very strictly defined. At a point from the Gulf about one hundred miles by road or three hundred by river, occurs its eastern limit. Here I came upon a ridge densely covered with cactuses of large size and a few scattering trees, where I found this bird in such numbers that at times a dozen could be seen at once; and in an hour or two three of us examined as many as fifty nests in different stages of completion, from those just begun to those containing young ready to fly. The nest is large and usually confined to the prickly-pear cactus, so that it is easily found.

In flight this bird appeared to me more like a thrush than a wren. It was not very shy when away from the nest, and we could easily approach to within gunshot range; but at nearer approach it would dart off into thickets or trees, where it would dodge about among the branches, peering and scolding at us continually. Its song is loud and rather harsh, and unlike any other bird's song within my knowledge. I am unable to describe it. I have come upon this bird while feeding upon the seeds of ground-cacti, or upon worms or grubs in the ground. Many specimens taken had their bills covered with mud. It was very difficult to see it about its nest. Only once did I see one fly from a nest which was but half constructed. I saw nothing like creeping in its habits, and I do not know why it should be named Brown-headed Creeper Wren. I did not meet with it until the 7th of May, probably owing to our having to go some distance from the ranch to reach the open cactus ridges, where it loves to dwell. It is eminently a bird of the cactus, still not altogether confined to it for nesting purposes. I have discovered its



nests in junco, and mesquite trees. On May 21 I found two new but empty nests, some ten feet from the ground, one on each side of an ebony standing alone, and on the same day a fine nest in the lower part of a large mistletoe, at least sixteen feet from the ground, in a mesquite tree. Several times I examined nests in the junco, which is oftener seen in bush-form than in proportions entitling it to the name of tree. It consists of a mass of green thorns, without leaves, and so full of pitch that it readily burns when green and full of sap. The nests in the cacti were never found lower than three feet from the ground, and usually four or more.

The nests are well described in Dr. Coue's "Birds of the Colorado Valley," p. 158; and I can add little of interest. Nests of the previous season become battered down by the rains, and frequently a new one is built on the top of an old one. In none did I see twigs entering into their composition; all were composed of the long grasses abundant in the vicinity, and lined with feathers, sometimes to the very mouth of the retort or bottle-shaped structure. On May 14 I took my first nest of this bird, containing four addled eggs, which had been abandoned, as I had watched for their owners to put in an appearance without avail. On May 21 young nearly ready to fly, fresh eggs, and nests not yet finished, were found in abundance in the same locality, so that it is hard to tell about the particular season for breeding, or whether they rear more than one brood. One nest contained five eggs, the others four or less. The eggs are unmistakable in color and shape. They appear rich buff without a magnifying glass, so fine and closely laid are the spots upon the white

ground. They are quite slender, and more pointed at one end than the other. In size they average .94 by .65; the largest one taken is 1.00 by .66, and the smallest .88 by .63.

The four young taken May 21 from one nest, and preserved in alcohol, have top of head dark brown, back and quills colored like adult, but darker, the white streaks and spots much fainter, under parts like adult, with the black spots less conspicuous; russet on flanks, lower belly, and under tail-coverts very plain; bill brown; feet pale. Young, when first hatched, have fine, long, light brown down on the feather-tracts.

SENNET'S WARBLER.

(*Parula Nigritora*)

After reaching Lomita, April 8, the first two days were chiefly occupied in getting conveniences and supplies in order. On the first collecting day, we heard its notes, and the first Warbler obtained was this pretty little *Parula*. It is truly a bird of the forest, and delights to be in the the upper branches of the tallest trees. The song of the male is almost continuous as it flits about, and is so clear that it can be heard at a long distance and readily distinguished from all other birds. By its notes we could locate the bird, and this accounts for our securing so many more males than females. Were it not for its song, I doubt if we would have taken many, owing to their diminutive size and habit of frequenting the tops of the forest trees. As it was, by only taking such as came in our way, we shot over twenty specimens, and could have taken any number more had we set out for them alone. In feeding habits I could see nothing different from our familiar blue yellow-back, *P. americana*.

When the few specimens of this new

species were obtained in 1877, little or nothing was seen of its breeding habits. One of the great inducements to repeat the trip to the Rio Grande was to further our knowledge of this pretty warbler. From the time of my arrival at its habitat, early in April, nearly every day specimens were obtained and examined, to ascertain the condition of the ovaries, with the view of finding nests and eggs. How well I remember my anxiety, about the middle of May, when, after a number of week's stay and examination of many birds of this species, dissection showed the eggs to be only just developing. The weather was growing intensely hot, the time for our departure was set in the near future, and it seemed as if we could not obtain an egg of a bird so common, before returning home. But on May 17, while my assistant and I were trying to save some large birds, Pancho, our Mexican guide, brought me the most interesting and peculiar nest I had seen in that locality, together with one broken egg, belonging to this new warbler. He observed the nest while riding about the timber and chaparral, and it was while standing on his saddle, reaching for it, that his horse started and threw the only egg it contained to the ground. Our prospects thus looked brighter, and we had hopes of finding other nests within a few days. Instructions were given to all the Mexicans about the ranch to search clumps of moss and orchids for them, but without avail, and we left the country the latter part of May with but a single nest and a poor broken egg to illustrate the breeding habits of *P. nigrilora*. The date, May 17, of finding nest and egg, I judge to be unusually early. The great majority must breed in June, for on July 5, of the season before, what I have no doubt were young of this bird were found near

Brownsville by Dr. Merrill, but not recognized. None of our Northern form, *P. americana*, were observed on the trip, and the only form of *Parula* breeding on our Southern border is *nigrilora*. This Warbler must arrive on the Rio Grande in March, for in the first part of April it was there in full force. I confidently expect this bird to be found in wooded districts north of the Rio Grande and possibly north of the Nueces River. That this form has not been met with in Mexico by the several field ornithologists who have visited that section seems strange, yet the small size and forest habits of the bird would account perhaps for its being so long concealed from observation.

The nest is exceedingly interesting and beautiful. It is made in a gray mistletoe-like orchid, an air-plant very common on the Rio Grande, which establishes itself on the small branches of trees, and varies in size up to eight or ten inches in diameter. This one is six inches long by four and a half inches wide, quite firm in texture, and was fastened some ten feet from the ground, to the end of a drooping branch of brazil-tree in open woodland. The nest is constructed very simply, being formed by parting the gray leaves of the orchid and digging into its centre from the side, a cavity some two inches in diameter being made, with an opening of one and one-quarter inches. The bottom and sides are lined pretty well up with short cottony wood fibres, forming a fine matting for the eggs to rest upon. A firmer and more secure nest is seldom seen, although so easily made. I imagine a day would complete one, and certainly but little time need be wasted in selecting a site, for thousands of orchids stand out on the partially dead branches or on trees with little foliage. That



they build also in the hanging trusses of Spanish moss, so abundant everywhere, is true, the young before referred to being found in a nest in one.

The egg is very similar to *P. Americana*; its spots of lilac and brown forming a broad incompact band near the larger end, and over the whole surface now and then a fleck of same colors on the dull white ground. The egg measures .67 of an inch in length and .46 of an inch in breadth.

### Bacteria in Clothes.

CARLYLE gave us the philosophy of clothes, says the *British Medical Journal*, now Dr. Seitz, of Munich, gives us their bacteriology. On a worsted stocking he found 956 thriving colonies, while on a cotton sock there were 712. Both articles had been worn, but nothing is stated of the personal habits of the wearer. Thirty-three colonies were found on a glove, 20 on a piece of woolen stuff, and 9 on a piece of cloth. None of these articles had been worn. On a piece of cloth from a garment which had been worn a week there were 23 colonies. Of the micro-organisms on clothing relatively few were capable of causing disease. The pathogenic species were almost all staphylococci. In one case, however, the typhoid bacillus was found in clothing from 21 to 27 days, and the staphylococcus pyogenes albus (microbe of boils) 19 days after the articles had been worn. The anthrax bacillus found in clothes was still virulent after a year. The microbe of erysipelas, on the other hand, could not be found after 18 hours, nor the cholera vibrio after 3 days. Dr. Seitz concluded that in tuberculous patients the bacillus is not conveyed to linen worn next to the skin of the chest.

Alabaster exists in 17 different states.

### A Cheap Disinfectant.

VARIOUS metallic chlorides are very active as disinfectants, on account of the readiness with which they give up their chlorine, but the so called "chloride of lime" so generally used is often objectionable on account of its odor. A solution of chloride of lead has been recommended by Dr. Goulden, a London physician, as inodorous and more effective, while procurable at trifling expense. When bought as chloride of lead the cost is considerably more, however, than when the solution is prepared from the cheaper nitrate of lead by dissolving half a drachm of the nitrate in a pint or more of boiling water, and adding to a solution of two drachms of common salt in a pail or bucket of water. The clear fluid left after the sediment has subsided is a saturated solution of chloride of lead. A cloth dipped in this and hung up in a room will sweeten the atmosphere almost instantly, and the solution is equally effective for purifying sinks, drains, etc.

MEASUREMENTS of the force exerted by the human jaws have been made by Dr. G. V. Black, of Jacksonville, Fla. Several persons exceeded a force of 100 pounds with the incisors and 200 with the molars, a little girl of 7 years recording 30 pounds with incisors and 65 with molars, and a physician of 85 easily exceeding with the molars a force of 270 pounds, the limit of the recording apparatus. For chewing such food as beef, pork and mutton, a crushing force of 20 to 60 pounds is ordinarily necessary, but that actually exerted at each thrust of the teeth is much greater.

Diamonds have been found in 15 or 20 different localities in California.



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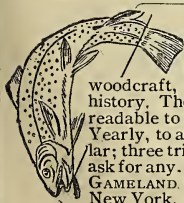
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NO. 3

## The Food Habits of Our Hawks.

THE rapacious birds are slow breeders, rearing only one brood in a year. The young grow slowly, and need a large amount of food. To satisfy their enormous appetites requires constant foraging on the part of the parents. Even the adults are great eaters, gorging to the utmost when they have a chance. Taking more food than is necessary for immediate use enables them to store up force for future emergencies, for they are often required to withstand exposures and long fasts, especially during inclement weather.

Hawks and owls are complementary to each other. While the former hunt by day and keep diurnal mammals in check, the latter, whose eyesight is keenest during twilight, capture nocturnal species. Again, the owls are less migratory than the hawks, and during the long winter nights they remain in the land of ice and snow to wage incessant warfare against the little enemies of the orchard, the garden, and the harvest-fields.

Owls and hawks often swallow their smaller victims entire. The larger

ones they tear into several pieces, swallowing the fragments. After the nutritious portion of the food has been absorbed, the indigestible parts, such as hair, feathers, bones and scales, are rolled into a solid ball by the muscles of the stomach. These masses, known as "pellets," are thrown up before food is taken. The movements of the stomach so shape the pellets that the sharp pieces of bone, which might otherwise injure the mucous membrane are carefully enveloped in a felty covering of hair or feathers. The pellets contain everything necessary to identify the food, and in the case of some of the owls which have regular roosting places the vast number of pellets that accumulate underneath give a perfect record of the results of their hunting excursions.

Some species of hawks are wholly beneficial, a few are harmful, while with others a balance must be struck between the good and the evil they do. The harmless kinds include the four kites. The "everglade kite" is found within our borders in Florida only. It feeds exclusively on a large fresh-

water snail, which abounds in the shallow lakes and overflowed sections. The swallow-tailed, white-tailed, and Mississippi kites feed largely upon reptiles and insects, never attacking birds. The swallow-tailed is reported as feeding extensively on cotton worms. If this is a common habit, the bird is of great value to the Southern planter. The Mississippi kite and its white-tailed ally devour large numbers of lizards, small snakes and insects, especially grasshoppers and beetles.

The rough-legged hawk is among the most beneficial of all hawks. Meadow mice and lemmings form its staple food. In this country the lemmings are not found, but in the North of Europe they occasionally form into vast migrating and devastating hordes which carry destruction to all crops in the country passed over. The meadow mouse is common in many parts of the United States; east of the Mississippi river it is the most destructive mammal to agriculture. It destroys meadows by tunneling under them and eating the roots of grass. It also destroys grain and various kinds of vegetables, especially tubers, but probably does even more damage by girdling young trees.

Nearly allied to the rough-leg is the squirrel hawk of the great plains—so called on account of its fondness for the ground squirrels so destructive in the West. Upon these it wages a continuous warfare, and great is the service it performs in keeping their numbers in check. Occasionally it eats pocket gophers. It is humiliating to think how many of the two noble hawks are murdered, and to reflect that legislators put a bounty on their heads to satisfy the ignorant prejudices of their constituents. Even gun clubs are so far behind the times as to offer prizes to those who kill the greatest number

of birds of prey. In 1892 considerable areas in Southeastern Scotland were overrun by meadow mice, a great amount of property being destroyed, such invasions may be expected in any country where predaceous mammals and birds are reduced to a minimum in the supposed interest of game preservation. This wholly upsets nature's balance, and the injurious rodents are left practically without an enemy to control their increase.

From its abundance and striking appearance the red-tailed hawk is probably the best known of all the larger hawks. It is commonly called "hen hawk," but the name is misleading. It does occasionally eat poultry, but the quantity is so small in comparison with the vast number of destructive rodents consumed as to be hardly worth mentioning. It prefers small mammals and reptiles. Another hawk generally called "hen hawk" is the red-shouldered hawk, which is very valuable to the farmer. It is more omnivorous than most birds of prey, feeding on mice, birds, snakes, fish, grasshoppers, centipedes, spiders, crawfish, earthworms and snails. Not two per cent of its food consists of poultry or game.

The food of Swainson's hawk is much the same as that of the two preceding species, except that more insects and fewer birds are taken. Soon after the breeding season these hawks collect on the plains of the west, forming large flocks, and feed almost exclusively on grasshoppers and crickets. If it be assumed that 100 grasshoppers are the daily food of one hawk we have a grand total of 600,000 for the work of a flock of 300 birds in one month. The weight of this vast number of insects would be about 2000 pounds. Estimates by entomologists place the



quantity of food daily devoured by a grasshopper as equal to its own weight; consequently, if these grasshoppers had been spared by the hawks, the farmers would have lost in one month thirty tons of produce. But each hawk doubtless eats at least 200 grasshoppers daily, which would double the amount, making sixty tons. This is the work of a month for only 300 hawks. What estimate can be placed on the services of the hundreds of thousands which are engaged in the same business for months at a time?

-What excuse can a man offer for wantonly slaughtering these birds? In many places, says Dr. Fisher, the author of the paper just quoted, hawks are all that are left of the mighty army which once waged war against the grasshoppers and kept them in check. The game birds, such as the wild turkeys, grouse and quail have been swept away by the ruthless hand of man, and even the skunks, foxes and snakes are rapidly following.

The broad-winged hawk, a medium sized species common throughout the Eastern United States, feeds largely on insects, small mammals, snakes, toads and frogs, and occasionally on small birds. It is especially fond of the large caterpillars of the large moths which feed upon the leaves of fruit and shade trees. These insects are too big and formidable for the smaller insectivorous birds to attack; hence their principle enemies are the hawks. The broad-winged hawk devours great numbers of grasshoppers, crickets and May beetles, probably the greatest damage done by it is in the destruction of toads and snakes, which are mainly insectivorous, and hence highly beneficial to the farmer.

The sparrow-hawk, found through-

out the United States, is the smallest and handsomest of our birds of prey, and with the possible exception of the red-tail, the best known. At times it follows the example of its larger relatives and attacks small birds, but these irregularities are so infrequent that they are more than outweighed by its good services in destroying insects and mice. Grasshoppers, crickets and other insects form its chief food during the warm weather, while mice predominate during the rest of the year. On account of the sparrow-hawks lack of fear it is one of the species that suffers most from the unjust bounty laws. Any vandal who can carry a gun is able to slaughter this little hawk.

The golden eagle eats game, such as fawns, rabbits, woodchucks, prairie dogs, and ground squirrels, also turkeys, grouse and waterfowl. At times it also troubles the young of domestic animals, notably lambs, pigs goats and poultry. It has been known to attack calves and colts. Over extensive areas of the West the golden eagle helps to keep many species of noxious rodents in check. In the more thickly inhabited regions, however, where such food is scarce, they often do great damage by carrying off lambs, young pigs, kids, and chickens. As many as 400 lambs are reported to have been taken from contiguous ranges in one season.

The bald eagle, the national emblem, is found throughout the United States. Its favorite food is fish, and where the latter can be obtained it will touch little else. A considerable part of the fish secured is taken from the fish-hawk; yet the eagle is capable of fishing for itself when necessity demands. Where fish are hard to obtain it will feed on water-fowl from the size of the swan down. Like the golden

eagle, it preys on many of the destructive rodents of the West, where it is considered a beneficial bird. Unfortunately, it is fond of lambs, pigs and poultry, and probably does as much damage as the golden eagle, in the more thickly inhabited regions. Much sensational matter has appeared from time to time in various newspapers about eagles attacking and carrying off children. Few of these stories have any foundations in truth, although in olden times, when eagles had less fear of man, they may have picked up an ungarded infant. The pigeon hawk, Richardson's hawk and Aplomado falcon are all true falcons. Though they feed on the flesh of birds, they destroy enough insects and noxious mammals to easily offset the damage they do. The prairie falcon inhabits the dry western plains and neighboring mountains, in the cliffs of which it builds its nest. It feeds extensively upon water fowl, quail, prairie chickens and other game.

In olden times, when falconry was a fashionable pastime, there were two types of hawks, each of which had its devotees. One, the true falcon, represented by the large gryfalcon and the peregrine falcon, captured its quarry by superior power of flight in the open country, while the other, the accipitrine hawks represented by the goshawk, although strong fliers, succeeded in capturing less by long flights than by short, rapid dashes or by skillfully turning upon their unsuspecting prey. In the United States the injurious hawks belong to these two classes and are represented by closely allied species.

The goshawk, Cooper's hawk and sharp-shinned hawk are accipitrines. This group is probably responsible for the unjust hatred and suspicion with

which our birds of prey, in general, are regarded. All three species feed largely on the flesh of birds, of which game and poultry form a considerable part. They capture their prey by quick turns and rapid dashes from cover, the victim being grasped before the hawk's presence is really suspected. The goshawk is a large and powerful bird, easily killing and carrying off a full-grown fowl. Many are the stories told of its audacity in attacking poultry, taking it almost from under the very feet of the owner, and even entering inhabited houses in pursuit of the intended victim. It has been known to attack a man.

Cooper's hawk is pre-eminently a "chicken hawk," and is by far the most destructive species, mainly because it is more numerous than the goshawk. It is especially fond of domesticated pigeons. Some of these hawks have learned that safe and easy foraging is to be found in large cities where the use of firearms is prohibited. In winter they congregate among the evergreens of the parks or in the shrubbery in the suburbs, sallying forth upon unsuspecting doves and English sparrows. The sharp-shinned hawk, an almost perfect miniature of Cooper's hawk, is equally destructive to bird life. It is very partial to young poultry. During recent winters it has increased about large cities of the East doubtless because it finds sparrows numerous and easy to procure.

One of the most valuable of birds from the economic point of view, is the barn owl, a Southern species. Its food is made up almost entirely of mammals, with now and then a few insects and occasionally a bird. Among the former are several species of rodents which are a curse to the country they inhabit—notably the pouched gophers



of the South. This owl feeds largely on the cotton rat, a mammal of destructive habits found abundantly in the bottom lands and near water. The common rat also is greedily devoured.

The barred owl is one of the larger common species in Eastern North America. It has the reputation of being very destructive to poultry, but this is not justified, though it does sometimes eat chickens. It is a cannibal, frequently eating smaller owls. It is fond of crawfish, frogs and fish.

The little screech owl is well known throughout the greater part of the United States. It is a diligent mouser and feeds extensively on insects. Also it is fond of crawfish, frogs, toads, scorpions, lizards and fish. Among insects, grasshoppers, crickets, beetles and cutworms are most often eaten. The screech owl catches many fish, especially in winter, when it watches near the breathing holes in the ice and seizes the luckless prey that comes to the surface.

The snowy owl is a large Arctic species which in winter occasionally occurs in considerable numbers in the United States. It does great good in destroying noxious mammals, including meadow mice and the common rat.

This useful bird is slaughtered in great numbers whenever it appears. As many as 500 were killed in New England during the winter of 1876-7.

Although the little burrowing owl is pre-eminently an insect eater, it also feeds on small mammals and rarely on birds. It is common throughout the plains of the West. During the warm months it feeds almost exclusively on insects and scorpions. The latter it picks up by scores, sometimes leaving a quart or more of heads, claws and tails of scorpions at a place of banquet. It takes grasshoppers, crickets, beetles and caterpillars in large quantities. The burrowing owl is a beautiful harmless bird, and ought to be protected by law.

The large and handsome "great-horned owl" is found throughout the United States where suitable timber exists for its habitation. It is an important ally of the ranchman in fighting the hordes of ground squirrels, gophers, prairie dogs, rabbits and other rodents which infest his fields and ranges. In regions where rabbits and squirrels are scarce it frequently makes inroads among fowls. As many as 100 rats have been found under one of its nests. The great-horned owl does a vast amount of good and, if farmers could be induced to shut up their chickens at night instead of allowing them to shelter in trees and in other exposed places, the principal damage done by this bird would be prevented.—*Selected.*





## C. Diogenes.

IN THE absence of any hint to the contrary, one might expect to find in this a sketch of the life of that peripatetic philosopher who, according to tradition cared more for the sun's genial glow than for prince's favor, and found artificial light necessary in his search for an honest neighbor. When fired with democratic fervor, we like to think of the daring he showed while dictating to his sovereign where he should stand; but the other incident gives us a poor opinion of his neighbors, or an exalted idea of his standard of honesty. This is about all we could say of Diogenes of old, unless we tried to give an account of his residence, and this could not be satisfactory. As the amateur photographer was not so omnipresent at that time as now, we have no picture of his home, nor any way of knowing, even if it were tub-like, that it was a tub.

But of C. Diogenes, we know more; to be more explicit, we should say we are perfectly acquainted with the life-history of *Cambarus Diogenes*, from the moment the burden of life is taken up until it is laid down. I say "is taken up," because that act is performed thousands of times daily by many individuals, all bearing the same name. This suggests a family; but the illusion will be dispelled when the statement is made that the subject is one of a species; for we are speaking of a crawfish, and not a man.

This interesting crawfish seems to have squatted in Northern Indiana and marked that section as his own—marked it in a way that is unmistakable, and, if unenduring, he feels no discouragement in erecting other signs of occupancy when the first efforts are destroyed. These peculiar emblems

are "chimneys" built upon the ground—not for subterranean fires, because the flues with which they are connected always lead to water, but built simply in finding a dump for excavated material.

"Diogenes" wanders, mole-like, underground; but occasionally he feels a longing for fresh air or a desire to bask in the sunshine, as did the first bearer of this name; then he laboriously works his way to the surface. That achievement does not afford permanent joy, for no sooner is he on the surface than he seems to wish to be below. In making his descent, he builds the chimney sometimes as much as eighteen inches high; the height, however, depends on the depth of the shaft, and this again depends upon the water-line.

Fortunately, there is a sort of adjustment in the relation between the softness of the earth and the digger. He grows rapidly during the rainy season, and with his growth comes the desire to dig; this desire can be gratified, because the ground is soft. By structure, he is qualified for his pursuit; the flat-like tail forms the platform of an elevator on which the little balls of mud are raised to the top of the chimney, where, by reason of their plastic state, they remain.

Some ancestor has evidently learned that falling bodies acquire a momentum, and that it is unsafe for one to leave a mud ball in a condition of unstable equilibrium; for now each descendant of this experienced ancestor looks with quizzical eyes after depositing each load, to see if it stays where he puts it or if it rolls outward over the crest. If it shows any impulse to follow him down, sooner or later, he thrusts it further upward.

There is a fair division of labor in his various parts. The digging implements are the front organs, the legs furnish locomotion, and the tail is the lift; of course, while loading, they all lend a hand. He simply stands on his head while the legs pass the mud ball up to his tail, and then he goes tail foremost up the shaft. Occasionally he rests on top of the chimney to see how his cousins are progressing or if another locality offers a more hopeful field for his labors; usually the spirit of contentment prevails, and down he goes to his work.

Harmony, perhaps dearly purchased, seems to exist—that kind of harmony which result in taking care of one's self; for only one workman is ever engaged in one hole. This a person can readily believe as one looks over the fields every square foot of which could boast of a new chimney. We must ask the naturalist to tell us why the crawfish digs; I only know how he digs, and so do all who live in Crawfish Flats, Indiana.—*Peterson's Magazine*.

**I**NSECTS are considered by Prof. Riley as undoubtedly possessing the senses of sight, touch, taste, smell and hearing, that of touch being perhaps the only sense strictly comparable with our own. Evidence of other sense organs, utterly unlike any we have, is not wanting. A male Japanese silkworm moth was liberated one night a mile and a half from a caged female of the same species, and in the morning was at the cage; and blind ants reduce wooden beams to mere shells without once gnawing through the surface.

A brown coloring matter, which dyes linen and promises to be of value, is stated to have been extracted from the leaves of the vine, especially the autumn leaves.

### The Cerulean Warbler.

**T**HIS pretty little warbler is one of the most abundant of its family.

It makes its abode in the tall timber of the bottom land of the creek and river valleys, and here, keeping high in the trees, rarely descending to the underbrush, while it is comparatively neumerous, often passes unnoticed by all except the more accurate observer.

It is a bird of the woodland exclusively and its name is at once associated with the air of the tall forest. It is rarely found in the open woods of the pasture lands. In its flitting motions when in search of insects, and in its jerking flight, can readily be seen that it is a genuine wood warbler. Its song which is frequently heard during the long, hot sultry days of summer, sounds very much like the syllables, *rheet, rheet, rheet, rheet, ridi, ridi, e-e-e-e-e*. It begins with a soft warbling sound and ends in a prolonged, but musical squeak. Its song is so common as to be an inseparable characteristic of our woods. It has the sharp, chipping alarm note of the various representatives of this family and is very shy when startled from the nest.

It builds its nest near the extremity of a horizontal limb in the top of some tall tree. Its nest is compact and very neatly built, being saddled on to the limb after the manner of other warblers. It is composed of strips of fine bark, stems of grasses, vegetable fibres, etc. woven into a strong rim, and lined with mosses, lichens, and pieces of hornets nests. The eggs are quite similar to those of the yellow warbler, but are, however, slightly smaller and with a ground color of greenish-white. It is thinly marked with minute spots of dark-reddish-brown, forming a ring of confluent blotches around the larger end.

*Chas. Reynolds.*



## Birds in the Thickets.

A THICKET of hazel and blackberry bushes presents an animated appearance on a bright June morning. Where the blackberry and hazel bushes and wild grape vines unite in forming an almost impenetrable thicket, and, as is usually the case, a stream flowing quietly by, with just enough murmur to lull one to repose, is a veritable paradise to the lover of nature—a place where he is fain to linger and study his favorites. Here no petty cares of life intervene to interrupt the grandeur of his thoughts. In the early dawn when the first light comes softly over the tops of the eastern hills, tinging the edges of the clouds with crimson and making the dew on the grass sparkle like diamonds, the birds begin to bestir themselves, and begin their morning songs. The voice of the farmer calling his cows from the pasture, mingles with the songs of the birds, and makes a melody that is charming to the ear of the naturalist. As the day wears on the songs gradually become fainter and farther apart, till at the sultry hours of noon-day the only sounds which break the death-like stillness which pervades the place, are the occasional tappings of a woodpecker, or the trilling of an Indigo bird as it sits securely hid in the foliage of some tall tree.

Prominent among the birds inhabiting the thickets along the streams, is the Yellow-breasted Chat. It is exceedingly animated and tuneful during the breeding season. It mounts to the top of a tree by short flights and jumps, singing loudly the whole time, and then descends by odd jerks and with much dangling of the legs and flirting of the tail, to the thicket. Next to the Mockingbird, it possesses a greater

variety of notes than any other species. On account of its exceeding loquaciousness it is often termed the "Yellow Mockingbird." It does not attempt to closely imitate other species but, never-the-less, approaches their songs. Thus one of them closely imitates the mewling of a cat; another, the barking of a dog; and a third, the whistling sound produced by a duck's wings when flying. This last sound is the one most frequently heard, and may be easily imitated by a good whistler, and the bird brought to the spot, where it dodges in and out uttering a deep-toned, emphatic, "tac." Its notes are heard frequently during moon-light nights, throughout the breeding season, when they unite with the cries of the Screech owls in giving the woods an awesome air.

The nest is built in a thicket, usually in a thorny bush or thick vine. It is quite bulky, composed of dry leaves, strips of loose bark, vegetable fibres, etc., and lined with fine grass and fibrous roots. The eggs are from three to five in number, glossy white, spotted thickly with various shades of lilac and reddish brown.

Another bird often seen and heard in such localities is the Chewink or Towhee. The Chewink is one of our most beautiful birds. It is handsome by reason of its bold contrasts. It comes very early, arriving in the Middle States during the first part of April. It spends the most of its time on the ground exploring the corners of the old rail fence, or the brush-piles along the edge of the thicket. As it flits from bush to bush, it opens its fan-like tail with a jerking motion, contrasting the white markings very strongly with its jet-black figure. It



flits about, in and out of the nooks and crannies of the brush piles, with its tail thrown up in the manner of a wren. It frequently calls out *chewink* or *towhee* with a metallic accent. It builds a compact nest on or near the ground, and lays from three to five roundish eggs of a whitish ground color, spotted with reddish brown and purple.

The Indigo Bird is an associate of the Yellow-Breasted Chat and Towhee. It is very inappropriately named the Indigo Bird, for its plumage is not indigo at all, but the richest cerulean blue. During the sultry days of summer its song is frequently the only one to be heard. Its song is somewhat harsh, though sprightly and vigorous, and is often uttered as the bird sits perched in some tall tree or on a telegraph wire along a railroad.

The Field Sparrow inhabits brushy localities, as old fields grown up in weeds, borders of thickets, etc. While it is as common as the Chipping Sparrow, and many times even more abundant, it is far less known on account of its secluded habits. It does not seek such localities on account of its fear, but only because that in such places are found the surroundings essential to its presence. It possesses a song remarkable for its plaintiveness, and did it possess more power, it would rank as one of our most accomplished vocalists. It builds its nest on the ground or a few feet above it, of hair, twigs, etc. The eggs are greenish-white, speckled with reddish-brown.

The White-eyed Vireo is an abundant species in such places as are inhabited by the Chat, Towhee, etc., but as this bird has been described in a former article in this magazine, I will not tire my readers by a lengthy description of its habits.

No other bird of North America has so extensive a range as the Yellow Warbler. It shares with the Goldfinch, as well as other warblers, the popular name of "Wild Canary." He is one of our best known birds and is a welcome friend to everyone on account of his song. It is one of our most confiding birds and frequently ventures to construct its nest among the trees in the towns. It builds its nest at various heights from the ground of plant fibres, strips of bark, etc., the whole formed into a cup-like structure and lined with soft cotton. The eggs are usually four or five in number and have a light green ground color, spotted with dots of purple and brown. In size they average .55 x .60. When the Cowbird lays an egg in the nest, the Warbler builds the nest up high enough to completely cover the parasitical egg. Two or three storied nests of this species are common.

*Bjorn G. Scott.*

### The Camel Outdone.

IT APPEARS that the camel's endurance of thirst is much surpassed by that of some other animals. Mr. S. M. Gorman, of Cambridge, Mass., has pointed out that a number of small rodents, inhabiting the arid plains near the Rocky mountains live for months at a time without even a single drop of water. The sand is torrid, the vegetation is burned up, yet these creatures survive. The observation has been confirmed by experiment, common mice having been kept in cages entirely unsupplied with water or other liquid from October first till January seventeenth, without seeming to suffer inconvenience. Their food during this long period was perfectly dry, such as Indian corn and grass seeds.

### The Myrtle Warbler.

THE Myrtle Warbler (*Dendroica Coronata*) may often be seen in winter, when the ground is covered with snow, in the dooryards in company with the snow birds, the sparrows and other familiar species, picking up bread crumbs from off the door steps, or exploring the nooks in the fence corners, or the crevices of trees for insects, and at evening flying in flocks to some sheltering tree to pass the night. They not infrequently roost in odd nooks and crannies in the barn or even in holes in some hay stack. During the early part of the winter they feed extensively on the berries of the Poison-vine (*Rhus toxicodendron*), large flocks of them being seen wherever this species is abundant.

During the winter the plumage becomes dull and unattractive, one being scarcely able to distinguish the sexes; but when the first flowers appear and the sunshine becomes warm, and the Canada goose in his northward flight heralds the approach of returning spring, his plumage assumes a gay appearance, being decked in black, white and yellow. At this season he is one of the most beautiful and striking among the feathered rivals of the bees which hum among the blooming apple trees. To be harmonious with nature at this time, he has an attractive song, somewhat resembling that of the Yellow Warbler, but possessing more sweetness and pertaining more of a warble than the Summer Yellow bird can boast of.

It usually constructs its nests on a horizontal branch, the smaller twigs of which are utilized in strengthening the rim. Its base and external portions consist of fine dry stalks of wild grasses and slender twigs and roots. It is lined with soft, fine grasses,

downy feathers and the fur of small mammals. The eggs are four or five in number, rosy-white, sprinkled at the larger end with reddish-brown.

*Wahltre Behym.*

### The Grosbeak.

BEING decked with a tri-colored livery, of deep black, pure white and rose red, the Rose Breasted Grosbeak (*Habia ludoviciana*) is one of our most beautiful and interesting birds. In the northern part, it is a summer resident, but in the southern part it hurries through as a transient visitor in the spring and fall. Its song is as remarkable as its plumage, and on this account is highly esteemed as a cage bird.

The nidification of this bird is as odd as its plumage. They usually select a low branching tree, sometimes an elm but more often a thorn tree, and here they lay together a few sticks and deposit a few stems of grass as a lining. The male assists the female in incubating the eggs and out of seven nests obtained by me, four of the parent birds secured on the nest were males. When a nest is disturbed, the parent birds all assemble in a neighboring tree and seem to be every interested in the operation of removing the eggs. The eggs so closely resemble those of the Tanagers that it is sometimes difficult to distinguish them. The position of the nest is usually different however, the Grosbeaks generally nesting on the central part of the tree, while the Tanagers seem to prefer the extremity of a horizontal branch.

Besides possessing great beauty of plumage and richness of song, he makes himself useful by destroying noxious insects. He is passionately fond of potato-bugs, and in some parts of the Mississippi valley he has acquired the name of "Potato-bug Bird."

*Watson Blakestey.*



## Antitoxin and Other Serum Cures.

NO CLAIMS of originality are made for this article. It is simply an effort to put into clear, untechnical language an explanation of what Tuberculin, Antitoxin, and other "serum cures" are; and to give the general reader some idea concerning them.

Many of the infectious and contagious diseases of man and the lower animals have been proven to be caused by bacteria and almost all are supposed to be so caused; (we must of course exclude those diseases caused by animal parasites).

The bacteria are a very low class of microscopic plants and of very simple structure; some rod shaped, others bead like, either singly or in chains, while still others are like small spiral coils. They increase in number by simply dividing into two parts, repeating the process within a short time. The different genera—i. e., *Bacillus*, *Diplococcus*, *Spirillum*, *Bacterium*, etc.—are named from their morphological peculiarities. Every species of bacteria has certain peculiar ways of growing when "planted" or inoculated upon beef broth, gelatin, blood serum, etc., and also certain reactions toward anilin dyes. It is by "culture" experiments and by staining that the different species are distinguished. Each species also produces during its growth one or more chemical substances known as plomaines, toxins, etc. The product varies with the species. Now, if for illustration, a single *Tubercullis bacillus* (Koch's bacillus), was placed in a culture tube of blood serum it would rapidly grow and divide until there would be millions of bacilli in the serum. During their growth these bacilli would produce a substance known as the poison or toxin of tuber-

culosis. This toxin in small quantities would stimulate the increase of bacilli but as the quantity of toxin increases it would check the growth of the bacilli and finally kill them. In the human body the bacillus tuberculosis produces consumption, also tuberculosis of the bowels. Koch supposed that by injecting serum in which the bacilli had grown, i. e., serum containing the toxin of tuberculosis, he could cure the disease. This serum he called Tuberculin, also known as Koch's lymph. The bacilli are killed by heat before the Tuberculin is used so that it is simply a solution of the toxin of tuberculosis. It was found that Tuberculin would not cure the disease but in all persons or animals infected by the disease it caused a rapid rise of temperature for a short time and hastened the course of the disease. It is now used only to detect tuberculosis in cattle and other domestic animals.

Now as to Antitoxin and other serum cures. These are based upon the theory of immunity. Behring and Ehrlich found that by injecting small quantities of virulent poison under the skin of an animal, allowing the animal to recover and repeating the process they could arrive at a point where the poison would have no effect and this tolerance is called "conferred" or "artificial immunity" as it is not naturally inherent in the animal but produced artificially.

It was also found that this immunity could be conferred upon other animals by injecting certain quantities of serum from the blood of "immunized" animals, and that this transferred immunity would last for some time and protect the animal from disease caused by the initial poison.



Ehrlich used vegetable poison while Behring proved these facts as applied to tetanus (lockjaw) and diphtheria. Diphtheria is produced by a dumb-bell shaped bacillus, known from its discoverer as the Klebs-Löffler bacillus. These occur in nearly solid masses in the false membranes in the throat. A portion of this membrane is placed in a culture tube with blood serum. The bacilli grow rapidly in the serum and soon it becomes thoroughly permeated with the bacilli and the diphtheretic toxin they produce. The bacilli are killed by the addition of five per cent carbolic acid and a certain amount of serum is injected into a horse. A slight rise in temperature and a slight swelling occur. The blood of the horse rapidly produces a substance, diphtheria antitoxin, which neutralize the toxin of the Klebs-Löffler bacillus and also gives the living cells of the body greater power of resisting the poison or toxin.

The horse receives these injections at intervals of a few days for six or eight weeks; by this time he can receive a very large dose without any effort; his blood is saturated with the antitoxic substances.

At this time a large vein in the neck is opened and from three quarts to a gallon of blood received into a sterilized receptacle. These are put on ice for about forty-eight hours; by this time the blood has separated into a firm clot and a clear yellow supernatant fluid, the serum. Guinea pigs are used in determining the antitoxic strength of the serum; and it is then put up in small bottles containing a dose each. A small quantity of some antiseptic is added to prevent decay. This is Diphtheretic Antitoxin and it will not only prevent but also cure diphtheria. We also have Antitoxin for Tetanus prepared in a similar man-

ner but it is not on the market. If recent reports from Germany are to be relied upon we are shortly to have Antitoxin for cholera, etc.

*Will C. Hall.*

### A new Discovery.

THE aboriginal remains unearthed a few weeks ago in a cave of the Port Royal mountains, in Jamaica, promise us an interesting glimpse of a vanished race.

An account by Dr. J. E. Duerden, of the Jamaica Museum, states that the Arawaks; who were a peaceable people probably numbering about 600,000 at the time of the discovery of Jamaica by Columbus in 1494, were so cruelly treated by their Spanish conquerors that the original type seems to have been completely destroyed before the English conquest of the Island in 1656. Little was left to show that these Indians ever existed. The only two aboriginal skulls hitherto known were found in a cave at Pedro Bluff, and practically the only relics of the native arts and manufactures have been some fragments of primitive pottery and a few flint implements and beads. The new find includes the skeletons of not less than twenty-four individuals of all ages from early infancy upward. With these were a canoe of cedar-wood, a well preserved mortar of arbor-vitæ, two small earthenware vessels, a flint implement, bones of the coney, and some marine and land shells. The cave is too small for a habitation for so many persons, and it is supposed to have been used as a burial-place and perhaps also as a refuge from the Spaniards.

Every precious stone known to the lapidary has been found within the limits of the United States.

## The Wood Pewee.

CONSIDERED in regard to their usefulness to man, few, if any of

our bird families take a higher rank than the flycatchers. Represented in Western New York by some nine species, they are characterized by their somber plumage, large heads, usually crested, and their flat triangular bills, with a row of bristles at the base. Most of our flycatchers have a habit of jerking and bobbing their tails and a peculiar manner of flight which renders them quite noticeable.

By no means the least interesting member of this family is the Wood Pewee (*Contopus virens*), which closely resembles its near relative the Phoebe (*Sayornis phoebe*), but it is smaller and much more shy and retiring.

The Wood Pewee, being a flycatcher, is of course migratory, arriving early in May, when the insects have become fairly numerous; it remains till the middle of September, when the frosts cut short its supply of food. Once here, it soon makes itself known by its prolonged plaintive notes. They cannot be called a song but a melancholy, though tender, call as though coming from a heart filled with sorrow. *Pe-e-e-we-e* resounds from the orchard and grove and the answer *pe-e-e-we-e* echoes back from the forest in the same subdued and tender strains. To many persons the notes of this bird would seem to present but little that is attractive or pleasing; yet to the Naturalist and lover of nature they have a peculiar sweetness, forming a pleasant contrast to the more hurried and boisterous songs of many of our birds. These notes, heard most frequently in thick woods and secluded groves, harmonize beautifully with their surroundings, which adds much

to their effect.

At midday, during the hot summer months, when all other birds are voiceless its plaintive call is heard among the trees; the woods at such times would be silent indeed were it not for the vocal efforts of these birds.

True to its name, the Wood Pewee delights especially in the solitude of deep forests, where, from its perch on some dead limb, it darts out after passing insects, snapping them up in its flat bill. Small flies and mosquitos constitute a part of its diet and each of its short jerky flights betokens the end of one or more of these winged torments. The number of insects which one of these birds will capture is surprising. Not only woods but orchards and roadsides are frequented by the Wood Pewee.

They are usually seen alone, each one choosing its own particular spot where it may be found day after day. Towards the last of May or early in June domestic duties begin to occupy their attention. Having selected some suitable branch, usually an oak, though sometimes an apple tree or maple, they set to work to construct a nest. A few bits of grass and vegetable fibres are woven together to form the walls, which are thick and flat. The bottom of the nest is thin, often being formed by the branch on which it rests. The outside is then covered over with the daintiest lichens, so that the whole can hardly be told from a natural enlargement of the limb itself.

Here are deposited three dainty eggs, creamy-white with a wreath of lilac and reddish-brown around the larger end. They hatch their young in comparative safety from Oologists and small boys; their nests are so well pro-



tected from sight that it requires careful searching to locate one, even after the tree has been spotted.

I remember the first nest of these birds that I found or rather helped to find. It was on June 29th., 1891, my brother and myself were searching in a piece of woods, where we had seen the birds frequently, when our attention was attracted by one of them alighting on a dead limb overhead. On this branch was what appeared to be a knot grown over with lichens, but from the actions of the birds we thought it was something of greater importance. Nor were we mistaken for on closer inspection it proved to be a nest containing three eggs of the Wood Pewee. How to get them was the next question. This seemed to be no easy matter for the nest was situated forty feet up in an oak, on a horizontal crotch of a dead limb, at least ten feet from the main body of the tree. With much planning and contriving we evolved a method which proved successful. A paste-board box lined with cotton was made fast to the end of a fish pole and to the extremity of another pole was fastened a teaspoon. Equipped with this apparatus we again proceeded to the tree and ascending as far as the nest, arranged ourselves among the branches, so as to maintain our equilibrium and yet have free use of both hands. By means of the fish pole the box was held close beside the nest, while in the same manner, with the spoon, the eggs were carefully lifted one at a time and placed on the cotton; they were then hauled in safely. Incubation was quite far advanced, but I succeeded in blowing them. Two days after I returned intending to collect the nest, but where was it? The branch on which the nest had formerly rested was there but only a small portion of

the nest remained. Surely no one had collected the nest in my absence. Just then a Wood Pewee, evidently one of the birds whose home had been destroyed, darted down to the limb and seizing a bit of the remaining vegetable fibres in its bill flew away with it to the woods. The mystery was solved. The birds had used the material of their old home to construct a new one. This was soon discovered, in an oak, about four rods from the first and similarly placed. Here they laid three eggs but a high wind blew them from the nest. Nothing daunted they again moved the nest, taking it apart and carrying it, bit by bit.

This time they selected a small maple about fifteen rods from the second site. The nest was placed on a horizontal branch about twenty feet up and I think they succeeded in rearing their young which they had so fully earned.

*N. Raymond Reed.*

A GOLD medal was recently awarded Herr von Prosch for his success in introducing tropical birds into German forests. Disliking to keep his pets in cages, his canaries were first liberated in a large room, then allowed to pass out and in through small windows, always getting their food inside. The birds soon began to build nests outside and to rear their young there. Two pairs of South American parrots were next set free, and last summer raised a brood of young, which with the old birds, passed safely through the exceptionally severe winter. In their wild life, the yellow of some of the canaries has disappeared, the entire tribe now having the green color of canaries in their native islands. This new bird colony is located in Southeastern Saxony, where the average winter temperature is about that of New York and St. Louis, the summers being more like those of Quebec.



## Jackson's Hole.

AS THE recent massacre (?) of the whites near Jackson's Hole is still fresh in the minds of the readers of THE NATURALIST AND COLLECTOR, we give a description of this sportsman's paradise. It is, indeed, too beautiful a place to bear such a name. The name is supposed to be derived from a man named Jackson, a member of a band of cattle thieves, who after stealing the cattle would drive them to this grazing ground, where they thought they were safe, as rarely a sheriff had nerve enough to enter the strip to arrest them. But it seems Jackson was arrested and sent to the penitentiary, thus bringing disgrace upon his craft in not dying at the hands of the vigilantes instead of ingloriously surrendering.

In the late Indian troubles the whites were really to blame. Tourists from the East were only too willing to pay as high as five dollars a day for a guide and one dollar a day for ponies that were needed, and should a fine pair of antlers present themselves a gold coin would suffice to attach the guilt to the Indians. Incidentally, the Indians were careless with their fires, destroying timber and game alike. It is to be regretted that the valley, so admirably adapted to the protection of game should have been allowed to lie open to the grasp of cattle men who now control it. One way to settle the dispute between the whites and Indians is to extend the Yellowstone Park to the South fifty miles, making the crest of the Leon range the Western border line.

Jackson's Hole is one of the best hunting grounds in the United States. The hole is a narrow valley, lying just

South of and bordering on the Yellowstone National Park. It is walled on the west by the Teton range, of which the Grand Teton is a magnificent peak, about 14,400 feet above the sea level. On the east are found the Gros Ventre mountains, and other spurs of the Wind River range, and two chains of mountains are nowhere more than two miles apart. At its lowest point the valley is said to be 6,000 feet above the sea. At the head of the valley are found four of the most beautiful lakes imaginable. The largest of these is Jackson's Lake, and it is from the West side of the lake that Mount Moran rises, clear cut as a monument, 6,000 feet above the water. These lakes are practically the head of the Great Snake river, which after running to the South for some fifty miles, breaks through the Teton chain by a gorge that may almost be compared with that of the Colorado, and to the Pacific. There is, however, a source of the Snake river still higher—a spring that lies on a mountain side, up in the Yellowstone Park, from which the water runs down to the hog's back and divides, a part of this water becoming the Snake river and a part the Yellowstone itself.

Born of the glaciers of the Teton range and of the melting snows that last in the Wind River mountains almost all summer, the waters of Jackson's Hole, whether in lake or stream, are so cold that they make the hands of the tourist ache when he bathes himself, even in warm weather. That they are perfectly pure and clear hardly need to be said. But to the Sportsman the coldness and beauty of the waters are of only secondary interest, for the rainbow trout of the Pacific slope may be found in such numbers as

almost to pass the belief of an Eastern man. Running in size from eight ounces to two pounds, they have an appetite for flies and a love of liberty when hooked and a vigor of muscle to back their desires that, combined, keep the fisherman in such a state of mental and physical activity as may rarely be experienced elsewhere. The best trail up the valley lies up the Eastern side. It wends along over grassy, rolling meadows that are everywhere dotted over with groves, large and small, of cottonwood and spruce trees. The tourist's eye feasts on the beauties of the vast natural park as he drives over the vast rolling grass lands, but the sportsman's eye turns with an eager light on the herds of antelopes that are seen on every hand. From a convenient ridge in August and September, when a view of the herds at their best may be had, thousands of antelopes may be seen at one glance. In but one other valley—the upper part of the Wind river—are as many of the beautiful animals found.

On every hand one sees on the mountain sides trails that are like cow paths, deep and broad—trails that the herds of elk follow in their wanderings—and if one will follow these trails he will see them end on a point of rock that projects from the mountain side or hangs over some lofty precipice, giving a commanding view of the region for miles around. To these look-outs the lordly stag goes to view the scenery. The tourist who stands on one may even see an elk, with his antlers high in air, standing on another, just out of rifle range. Never was this game stalked in a more magnificent region. To the elk may be added the moose, and if a tourist has a longing to get a bear, it may be gratified here, and that too, without much trouble. Mountain sheep are seen occasionally,

but not a large percentage of even skilled hunters will add one of these to his trophies. Of the smaller game, as the birds, there is enough, and when one tires of wild meat, beef may be had from the settlers. In short with the tourist with sporting blood, it is an ideal region.

### Fishes of the Colorado.

THE Colorado basin is one of the largest in the United States, draining not less than 225,000 square miles, yet according to a paper prepared for the U. S. Fish Commission by Messers Everman and Rutler, it contains but thirty-two species of eighteen genera. These belong to the following five families: Catostomidae, or suckers, eight species; Cyprinidae, or minnows, nineteen; Salmonidae, or trout and whitefish, two; Poeciliidae, or top minnows, two; and Cottidae, or blobs, one. All but seven of the species are thus far known only from this basin. In comparison, it is stated that eighty different species are known from the basin of the Rio Grande, 140 from that of the Missouri, and 130 from the Wabash basin.

Sapphires of small size but great brilliance have been found in North Carolina.

INDIA, according to Mr. S. E. Peal, has a stridulating spider whose sound—like the pouring of shot upon a plate—can be heard ten or twelve yards; ants that produce sounds by rasping the horny tip of the last abdominal segment against dry leaves or twigs; and a butterfly which produces a series of taps with its wings.

M. S. Vaillard has found tetanus antitoxin to confer complete immunity for four to six weeks, but it does not arrest the established disease.



## The Nesting Habits of the Woodcock.

THE Whistling Woodcock, or, as he is often called by the hunter, the long-bill or bog-sucker, is a very interesting species, both to the lover of observations and as well to the wing-shot who eagerly seeks him in the covers. Viewed as an adaptation to requirements, its oddly shaped bill and peculiar coloration may not cause us to wonder, but to the curious its oddity of form and habits, together with its mysterious ways, are ever a cause of comment. The artist is highly pleased with the matchless shades of umber, siennas and caledonian and bone browns, and one could not wish for a handsomer combination of mottled colors. These blended shades afford the hunted bird its needed protective disguise, so essential to its safety.

This interesting species varies in its period of arrival from the south, in Lower Michigan. It is not rare to find the birds as early as March first, and it has been recorded in January and February. In fact, the species may be said to be a winter resident at times, but the majority of the birds do not appear until after March fifteenth or even later, being regulated in their appearance, as with the snipe, by the condition of the ground about their feeding haunts. At the proper time a great many woodcock drop down upon us. Some fine, moist morning in spring a cover may be found well supplied with birds, which did not contain a specimen of this species the day before. This results from the habit of the woodcock, shared in by most, if not all of the birds of this class, of migrating in the night-time. The habit is often the cause of its death, for as the long-bill flies low it is not rare that a bird comes in contact with one of the

many wires which interlace the entire country.

About the middle of April the mating season is at its height, although I am fairly well satisfied that the birds are generally mated upon their arrival from the south. Nevertheless, the festive woodcock passes through a seasonal love-making and at this time the so-called song may be heard. It is rare to hear the love-song later than June tenth, though information as to its being heard in autumn is occasionally offered. This song is, so far as my observations go, confined to a single note, although from descriptions read, one might consider the long-bill a musical prodigy.

The note, which may be called its love-song, is always, so far as I am able to learn, uttered while the bird is on the wing. Though so simple, it is never uttered often enough to be called monotonous. It is rarely heard unless one seeks the haunts of the woodcock at twilight's hour. Simple though it is, the song undoubtedly answers the purpose of charming the lady in the case as fully as the refrain of the more gifted thrush or the tanager's pleasing carol. We may well believe, too, that there is a little brown hen listening to the notes as she sits among the damp leaves of the glade or beneath some protecting bush, or, perhaps, already broods her four spotted eggs. The male dashes about the willow copse, marsh, lake or river more after the manner of a large bat than a sensible bird. Suddenly he plunges into a damp patch and proceeds to fill up on soft insects and worms. No one who has not studied the subject can calculate how great an amount of food of this nature a single bird can manage to stow away.



Their capacity is simply amazing, and with a remarkable digestion, it is not to be wondered at that they are great destroyers of worms and insects. If we are to credit Audubon, that accurate observer and celebrated Naturalist, the woodcock will devour as many worms in a single night as its weight.

On coming to a proper feeding place they thrust their long bills into the soft earth. This is done, it would seem quite at random, but the results are entirely satisfactory to the birds, for worms and insects of all sizes and conditions are hauled to the surface and swallowed with apparent relish. These holes, borings they are called by the hunters, are often made in great number in small spaces, with large areas of apparently equally good surface untouched. The birds evidently know as well where food is to be found beneath the surface as does the sounding woodpecker, as he thumps upon the dead branch. The sense of direction, or instinct, as the sense or feature was formerly called, seems to guide them in their searches. This may be considered an innate trait, but at least, whether acquired by practice or not we may fairly call intuitive, and of equal rank with that discrimination possessed by squirrels, which generally enables them to select and reject good and bad nuts.

Mating having taken place after much flurry, in which the success of the favored male seems gained from the superiority of gyrating flight, as the birds certainly cannot fight well, the nesting site is chosen. The point decided on is nearly always, so far as my experience goes, near to trees or bushes, where some protection is offered, but the trees are often absent and the bushes may be few and much scattered, and I have met with nests

almost entirely in the open. The spot where the eggs are laid is always exposed, and though the excuse of a nest be placed near or directly under a bush, yet it is always in plain sight, and in only one instance have I found the eggs really concealed.

It is safe to say that in four cases out of five the nest is nothing, the eggs being deposited on the bare leaves of the previous year, in a small natural depression. In some instances there is evidenced more attention by the old birds, and in two cases which I have met with, there was proof of quite an amount of skill. One of these nests was two or more inches high at the edges, and formed artistically of dead leaves. The other nest was largely composed of twigs and substantially lined with dead grass and was placed between weed-stalks which supported it at several inches elevation.

In the woods, where the sun's rays cannot strike or only partially, and where the spring rains have soaked the low ground which the birds always select, the surface is generally wet and consequently the eggs are often found on moist leaves and grasses.

The eggs, four in number, are generally laid in late April or early May, but are often found by April 15th, and I have seen young in April, which led me to believe that the first egg must have been laid in March. Of course the season and locality have much to do with the time. There are many late nestings also, and I am satisfied that many young are hatched in July. At one time we had a ridiculous state law which opened the woodcock season July 5th. When hunting on that date one season I found a brood of young but a few days old.

The eggs are buff in their ground color or occasionally creamy, spotted

with various shades of reddish-brown. The eggs are quite unlike the eggs of all others of the snipe family, so far as I can learn, both in shape and markings. They lack that pointed small end found in the eggs of most if not all the other species of the family, a shape which is well described by the word pyriform, meaning pear-shape. They differ but little in size, so far as I am able to judge, and about  $1.53 \times 1.19$  of inches is a fair average. Davie says that eggs have been reported 1.80 long, but adds that he has never seen any as large.

The coloration of the eggs is such that the nest is found with difficulty, even when we know that the treasures lie within a limited area. However the protective coloration of the eggs is as nothing compared to that of the plumage of the incubating bird in its resemblance to the surroundings. On flushing a bird from an incomplete set, I have repeatedly marked the place with readily recognized land-marks, and I have then returned after a few hours or days and looked for the bird and nest.

It is indeed surprising how the creatures will spread out on the nest and resemble the appearance of the surroundings. This is so successfully accomplished, the bird being evidently aware of its security from observation, that it is not an easy matter to discover the setter even when we know the exact square yard of space in which the nest is situated. This is markedly so if the ground is broken and the surface uneven.

The bird when discovered on the nest is observed resting the end of its long beak on the leaves or ground, while its large dark watchful eye is seen to shine forth as it silently contemplates our movements. When the

eggs are freshly laid the bird quits her nesting place while an intruder is still ten feet or more from her, but as incubation advances the setter appears less inclined to leave her eggs. I have repeatedly stepped within a yard of a nest before the old bird flushed, and in one instance I must have walked right over the bird, which arose after I had passed by.

The flush of the setting bird is unaccompanied by the exhilarating whistle of the wings which stimulates the autumn gunner. The creature is bent on luring us from the spot and for this purpose barely keeps above the ground. The wings are flapped in a shiftless, ludicrous fashion, and the bird appears wounded and moves in a slow and dejected manner. Not infrequently the ruse works well and the intruder follows the apparently sorely wounded bird, and of course to no purpose, as she will escape every time after enticing a person a little distance from the nest.

I have not infrequently discovered the young birds from a day to a week or more old. They are queer little fellows, and to the unobservant bear but slight resemblance to the mature birds, but by the naturalist they are readily identified, more particularly by their long bills which is their chief claim of likeness to their parents.

They are indeed pretty creatures at first and while in their downy coat but soon assume a rough appearance by the growth of pin-feathers. After a few days of home life they take to wandering about and often become separated like young robins. When large enough they scuttle away on being disturbed and will conceal themselves if given the opportunity, but this is not done with anything like the skill and expedition shown by



the young quail and grouse. When first observed, if undisturbed, they will be found resting on their bills, or seeming to, after the manner of the old birds; however if one departs from the scene and later returns to the spot, it will be found that the mother-bird has withdrawn her brood to a place of concealment.

Many years ago there was a strip of sparsely wooded low land along the river, and there the woodcock could always be found in the nesting season. It was rare for a year to pass when nests were not found and some springs I added several sets of eggs to my precious cabinet. Along one side of this strip of mixed ash, elm, basswood and soft maple ran a railway. On the other side was the placid river fringed with alder and a variety of willow bushes. It was indeed a grand spot for a lover of out-door life, for one could wade for shells, fish from the logs, watch the migrating hordes of warblers, hunt for woodcock's nests, and take any amount of interesting notes. But alas! the woodman's axe has done its work and the city sportsman's dog and gun have completed the work of destruction and desolation.

*Morris Gibbs, M. D.*

### Meteorological Stations.

THE first meteorological station on a mountain summit was established in 1870 on Mount Washington, at a height of 6280 feet, and the station afterward in operation on Pike's Peak, at an elevation of 14,134 feet, was for many years the highest in the world. Both have been discontinued. The only summit stations now existing in the United States appear to be the one at low level on Blue Hill, Mass. and that at the Lick Observatory, at about 4000 feet on Mount Hamilton,

Cal., but an American institution—Harvard College Observatory—claims the highest station as an outpost at Arequika, Peru. Since 1893 the Arequika staff has made observations on the summit of the volcano of El Misti, 19,300 feet high, self-recording instruments—operating for a fortnight—being used and frequently visited from a lower and more habitable point. France has a series of important summit stations—the Puy de Dome, the Pic du Midi, the Mont Ventoux, and the Aigonal—at heights ranging from about 5,000 to 10,000 feet, with several summer stations near Mont Blanc, the observatory of Mr. Janssen, in the snow of the very summit of Mont Blanc at 15,780 feet, being yet unused. The instruments on the Eiffel Tower, in Paris, at 980 feet, are placed more nearly in the conditions of free air, than those of any other permanent station at so considerable an elevation. Among German and Austrian stations, that on the Sonnblick, 10,170 feet high is the loftiest in Europe that is occupied throughout the year. Switzerland has a summit station on the Santis at 8,200 feet. Italy has recently completed one on Monte Cimone at 7100 feet, and Great Britain has a remarkable record of hourly observations for ten years from its highest summit, Ben Nevis, at an elevation of 4400 feet. These elevated points of observation have supplied many facts concerning temperature, winds, storms, etc., that could not have been learned without them.

THE seiche of Lake Geneva consists in an alternate rise and fall of the surface of the water from a few inches to about six feet, this curious oscillation sometimes lasting 20 or 25 minutes. Prof. Forel believes the cause is neither storms, winds nor pressure variation, but earth tremors.



# THE ✧ NOTE ✧ BOOK.

To judge from the confessions of some of our class publications, we should say this is an age of devotion. We have journals devoted to Ornithology, Archaeology, Botany etc., but the primary object of their devotion is the Almighty Dollar. In this devotion we heartily coincide with them. Without the aid of your dollars, we can do nothing. We believe that the best way to obtain your aid and dollars is by pleasing you more than anyone else can. The only way we can please you is by giving you a better magazine for a nominal sum than anyone else does. If over three hundred pages of interesting reading matter is not worth the small amount of seventy-five cents we would esteem it a favor to have someone suggest to us what more we can do. If you agree with us when we say that it is worth the amount we charge for it we would be pleased to have your name on our list. To all who do not care to subscribe for a full year, we have made the low rate of twenty-five cents for a six month's trial subscription. The character of this journal will not degenerate in the least. As the second number was an improvement on the first, and this one on the second, so will every future issue be in advance of the preceeding one. We desire to increase the number of pages and also to use a better quality of paper, new type, etc. If every one reading this notice will send us their subscription, together with that of a friend we will be able to make such improvements as will place us far in advance of any journal now

published. To encourage you to work for us we will allow liberal discounts for clubs. To all who will send us two yearly subscriptions, together with \$1.50 to pay for same, we will send the NATURALIST AND COLLECTOR as a reward for his efforts. If ten names are sent we will take them at the very low rate of thirty-five cents each. If any one should desire to take another journal in connection with this one, he will find very cheap rates on another page. In several cases the price for both are just equal to the usual price of one. These rates will soon be advanced and should be taken advantage of at once. If you are favorably impressed with the merits of this journal do not lay it aside without sending us your name.

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As a great many of our patrons have requested to run an exchange column, we have decided to incorporate this feature in our next number. We are reluctant to take this step, believing that it detracts from the artistic appearance, but this journal is not published solely to gratify our selfish desires, but for the entertainment and profit of our readers. We have, however decided to limit the space to one page and as long as this space will allow, subscribers can insert notices of less than fifty words free of charge. No cash offers will be run in this department. They must be placed in our regular advertising columns and paid for at regular rates. Nobody but regular subscribers will be allowed space and if anyone wishes to use this column it is necessary for them to have

his name on our subscription list. There is no limit to the number of notices one can have in a year as long as it is not used to excess.

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We desire our friends to send us at all times, such articles as will interest our readers. Articles with or without illustrations, on Oology, Ornithology, Mammalogy, Botany, Geology, Mineralogy, Archaeology, etc., will be thankfully received. Do not be afraid to send them on account of the shortness. Size is not always a symbol of merit. A wasp is not very large but makes itself felt just the same. Send on your article.

† † †

In our advertising columns will be found almost remarkable offer. For a

short time, we propose to boom our journal even if there be no money in it, and to that end make a remarkably low rate. We offer to send \$1.00 worth of specimens as a premium for one new subscriber, when \$1.00 accompanies the letter to pay for the subscription. While our regular rate is but seventy-five cents, we have, in order to protect those who have previously sent their subscriptions, decided to charge \$1.00 for a year's subscription, together with one dollars worth of specimens as a premium. We do not issue a list, with articles enumerated at padded prices, but allow you to select your premiums from the catalogue of any dealer, advertising in this journal. Do not delay about sending us your subscriptions but send them by return mail.



## Mushroom Culture.

AS many enquiries have been received relating to the best methods of cultivating Mushrooms, we have deemed it advisable to run this sketch in place of our regular article. It is clipped from the *Philadelphia Record*, and treats the subject in a comprehensible style: It seems very strange that so little is known of the mushroom industry, which in America is a product of the last decade. The men who make a business of growing mushrooms for the market, of whom there are quite a number in the vicinity of Philadelphia, realize that they have a good thing, and the greater the secrecy surrounding the industry the better it is for them. They consequently guard their various methods jealously, although within the past two or three years many wealthy residents of the suburbs who have stables, and gardeners, and greenhouses, have taken up the culture of mushrooms, and have met with gratifying results in their experiments. The curious little vegetable, for it is classed in that category, thrives best in the dark, or at least away from the sunlight, and many people have recently established mushroom beds in the cellars of their city homes.

William Falconer, who is perhaps the best authority on mushroom culture in America, says: "In the most prosperous and progressive of all countries, with a population of nearly 70,000,000 of people, alert to every profitable, legitimate business, mushroom growing, one of the simple and most remunerative of industries, is almost unknown. The raising of mushrooms is within the reach of nearly everyone. Good materials to work with and careful attention to all practical details

should give good returns. The industry is one in which women and children can take part, as well as men. It furnishes indoor employment in winter, and there is very little hard labor attached to it, while it can be made subsidiary to almost any other business, and even a recreation, as well as a source of profit."

Among the largest mushroom growers in the vicinity of Philadelphia who supply the market the Mushroom Culture Company, at Landale, the Andre Nursery at Doylestown, the Rokeby farm at Westtown, Chester County, and the Penrose Nursery down at Nineteenth and Catharine streets. The proprietors of these establishments raise all their crops from mushroom spawn, as indeed do the private growers. This spawn is in itself one of the most curious features of the industry.

It comes in compressed cakes about nine inches long by five inches wide, and an inch and a quarter thick. The spawn is all imported from England and France, although efforts are now being made by a grower in Rhode Island to produce it. A Chestnut street seed man who makes a specialty of supplying the spawn to growers explained to a *Record* reporter just what it was, how it is made and the way in which it is planted, all of which is very interesting.

What practical mushroom growers call spawn, he said, is what the botanist terms mycelium. The spawn is the true mushroom plant\* and permeates the ground in which it may be growing. It is represented by a delicate, white, mold-like network of threads which traverse the soil. The mushroom bears myriads of spores which are analogous to seeds, and these be-



come diffused in the atmosphere and fall upon the ground. Most of the spawn is made near London. One man, John F. Barter, grows about 21,000 pounds of mushrooms a year, and in summer manufactures about 160,000 pounds of spawn for sale. This one man makes about three times as much spawn as the entire importation into the country amounts to, which shows how much greater the mushroom growing industry is in Europe than in America.

The spawn is made from fresh manure, which is formed into bricks and spread to dry. When about half dry a hole is made in the side of each brick and a piece of old spawn about an inch

square is inserted. At a certain stage the bricks are removed and baked in order to arrest further vegetation until required for use.

In and around Paris, where the champagne is eaten by everybody, enormous caves are used for the industry, but about Philadelphia most of the mushrooms are grown in green houses. They are cultivated most extensively in winter. The beds are prepared about the first of October, the spawn is cut into small pieces and planted at a distance of about nine inches apart. In forty days from the time of spawning the first crop is ready for picking, and the spawn does not become exhausted until June.



# Current Literature.

*How to Know The Wild Flowers.* A guide to the Names, Habits, and Haunts of our Common Wild Flowers. By Mrs. William Starr Dana. New edition, with 152 illustrations. Chas. Scribner's Sons, New York. Cloth, crown 8vo; \$1.75

In this book the classification of plants as regards their color, time of blooming, etc., is first reduced to a satisfactory system. It describes over 450 species of our wild flowers in such a clear and original manner that anyone, whether versed in the technical terms of botany, or not, can readily identify the common plants that are met with in his rambles. The book has had great popularity, as is evidenced by the fact that it is now in its twenty-seventh thousand. In this new edition various additions have been made, which makes it all that could be desired for a field book of botany. If the book would be introduced in all schools where elementary botany is studied much of the natural aversion to it would be overcome and the study made one of great interest to all. In connection with the descriptions of the flowers many charming bits of scenery are described. The illustrations are well drawn and true to nature.

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*The Naturalist's Directory*, compiled by S. E. Casino. Published by S. E. Casino, Boston. Paper. 12mo; price \$2.00.

This work has passed through several editions and is too well known to need any special comment. In this edition, however, a new departure has been made. In addition to the regular alphabetical arrangement all the names have been classified according to states and the subjects in which they are interested. The directory contains the names of over 5,500 Naturalists in the United States and Canada. Such a directory is an absolute necessity to every Naturalist and the one compiled by Mr. Casino is undoubtedly the best and should be in the hands of all collectors. A new edition will be issued about March, 1896, and all should send their names and specialty for insertion.

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With the July number the *Iowa Ornithologist* completed its first volume. It has been an interesting and instructive journal from the start and is worthy of all the praise which may be bestowed upon it. It is published in

the interest of the Iowa Ornithological Association and is one of the best journals now published.

\* \*

*Wild Beasts*, by J. Hampden Porter. A study of the habits of the Elephant, Lion, Leopard, etc. Illustrated. Chas. Scribner's Sons, New York. Cloth: \$2.00.

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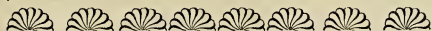
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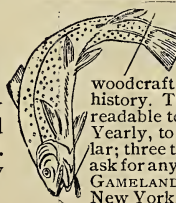
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